Scored for ERL

III.5.A.

Region 6

Superfund Site Strategy Recommendation

Site Name: Union Carbide Corp. Site Number: TXD 008 114 092

Alias Site Name(s): _____

Address: HWY 48 - Port of Brownsville

City/County or Parish/State/Zip: Brownsville, TX (Cameron County), 78520

Recommendation:

☐ 1. No further action needed; no hazardous waste problem.

☑ 2. No further remedial action planned under Superfund; site would not score high enough using the Hazard Ranking System to be considered for the National Priorities List.

☑ 3. No further remedial action planned Under Superfund; action may be appropriate under other authority: RCRA ✓ NPDES _____ SPCC _____
404 _____ TSCA _____ UIC _____ SMCRA _____ State _____
Other _____.

☐ 4. Further pre-remedial investigative action needed under Superfund:

PA _____
SSI _____ Priority: High____ Medium____
LSI _____
Other _____
To be performed by _____

Discussion:

See Attachment

Copies to (please list): bcc - 6H-HO (with copy of Report)

Recommended By: David Gonzalez (6H-ES) Date: 9/12/88.

Approved By: Wesley G. Tutwiler Date: 9-23-88

Union Carbide - Brownsville, TX (TXD008114092)
09/12/88

Recommendation: No further remedial action planned under Superfund; action may be appropriate under RCRA.

Discussion:

Union Carbide's Brownsville plant was investigated under the Environmental Priorities Initiative (EPI). The purpose of this program was to identify the highest priority hazardous waste sites in the country and refer these sites to the most applicable authority for action. This EPI investigation indicated that Union Carbide's Brownsville plant is an inactive, butane oxidation plant previously used to produce acetic acid, methyl ethyl ketone, ethyl acetate, formic acid, acetic anydride and propionic acid. Union carbide used a surface impoundment (land disposal unit) to dispose of "ball mill residue," spent caustic soda, and solids from various sumps. The other solid waste management units included two above ground tanks and an incinerator. In April 1987, Union Carbide began implementing a TWC approved full facility closure plan. The TWC has received authorization to implement the RCRA program within the state of Texas. At the present, it is unknown whether closure was ever completed. Due to the lack of both surface water and ground water useage in the vicinity of the facility as well as the lack of a direct contact threat, this facility is not considered to be a candidate for the National Priorities List. However, this facility still qualifies for RCRA action since this facility closed under a TWC approved closure plan.

1509 Main Street, Suite 900
Dallas, Texas
75201-4809

214/744-1641

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: David Wineman, RPO, USEPA Region 6

THRU: K.H. Malone, Jr., FITOM KHMw

THRU: Timothy A. Hall, AFITOM TAH.

FROM: Terry D. Pierce, FIT Chemist TDP

DATE: June 28, 1988

RE: Union Carbide Corporation PA Reassessment
Brownsville, TX
Cerclis No. TXD008114092
TDD No. F-6-8805-10
PAN No. FTX0766PAA

The FIT was tasked to conduct a PA reassessment of the Union Carbide Corporation (UCC) facility located in Brownsville, TX. The facility is a butane oxidation plant which is capable of producing acetic acid, methyl ethyl ketone, ethyl acetate, formic acid, acetic anhydride and propionic acid.

The last CERCLA action for this facility was in the form of a site inspection dated February 12, 1981 (see Attachment A). Several events have occurred since the last CERCLA activity. UCC idled the plant and released its local employees in March, 1983. In January, 1984, UCC decided to sell the facility. To date, it is unknown whether UCC still owns or has sold the facility. In November, 1985, UCC proposed a RCRA closure (full-facility closure) for its plant in Brownsville. The closure plan was approved by the Texas Water Commission (TWC) on September 26, 1986. Closure began on April 27, 1987. Closure inspections were conducted by the TWC on April 30, 1987 and June 16, 1987. The June 16, 1987 inspection noted that closure was not complete and file information is lacking after this date concerning other inspections and a closure completion date.

The UCC facility has four solid waste management units (SWMU). The facility utilized a ball mill residue basin (surface impoundment), an incinerator, and two above ground tanks. The ball mill residue basin received ball mill residues, spent caustic soda and solids from sumps, tanks and other processing equipment. Chromium waste and corrosive wastes were also deposited in the basin. The incinerator handled 2,000 tons of waste annually which was comprised of ignitable wastes and formic acid. The incinerator has not been

Reviewed by 6H-ES
Date
D.G. 9/12/88.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE : 09/13/88

SUBJECT : Potential Hazardous Waste Site

FROM : Ed Sierra for:
Dave Wineman, FIT RPO
Hazardous Waste Section (6E-SH)

TO : Presley B. Hatcher, Acting Chief
Site Assessment Section (6H-ES)

Site Name : Union Carbide Corp.

Location : Brownsville, TX

EPA ID No : TXD 008 114 092

TDD No : F06-8805-10

A. Deliverables :

1. Preliminary Assessment	attached( )
2. Site Inspection Report	attached( )
3. Sampling Inspection Report	attached( )
4. HRS Package	
Preliminary	attached( )
Final	attached( )
Support Documents	attached( )
5. Other PA reassessment	attached(X)

B. Were Drinking Water Wells sampled? Yes( ) No( )

C. Analytical Data :

1. None collected	( )
2. Field Data	( )
3. CLP Data	( )
4. Houston Lab Data	( )

COMMENTS: The FIT recommends a Site Inspection.

cc: (circle) Cabra 6W-S
Gazda 6E-E
Taylor 6H-CE

June 28, 1988

Union Carbide Corporation PA Reassessment
Brownsville, TX
Cerclis No. TXD008114092
TDD No. F-6-8805-10
PAN No. FTX0766PAA

used since 1978. File information did not address where the incinerator ash was disposed prior to 1978. All four units were included in the RCRA closure approved by TWC.

On May 4-6, 1982, UCC installed four monitoring wells around and near the ball mill residue basin under the direction of the TWC (see Attachment B). From the soil borings there appears to be a sand aquifer 1.5 to 4.5 feet in thickness occurring 13.5 to 16.5 feet below the ground surface. Below this unit there is a sandy clay with sand seams. Ground water quality from the four monitoring wells appears to be brackish to saline based upon the total dissolved solids content of the samples collected on December 2, 1982 and November 29, 1983. Concentrations range from 9,000 to 69,000 mg/L for Total Dissolved Solids (TDS), the majority of which appears to be sodium and chloride.

Ground water contamination appears to have occurred near the ball mill residue basin based upon a TWC letter to UCC dated June 22, 1986 (see Attachment C). The letter makes no reference to the substance or substances which has contaminated the ground water.

Ground water in the shallow aquifer does not appear to be utilized for drinking, irrigation, industrial or livestock in light of its brackish and saline qualities. General ground water maps of the area show ground water of usable quality approximately 7 miles west of the facility near Brownsville (see Attachment D). This water bearing formation near Brownsville is the alluvium aquifer of the Rio Grande River. Geological and hydrogeological data appears to be lacking concerning whether the shallow aquifer underneath the facility is in contact with the alluvium aquifer near Brownsville. The EPA Notification of Hazardous Waste Site form for this facility notes in Section I (see Attachment E) that test wells found no potable water source within 8 miles of the facility. This leaves the question of whether there are irrigation or industrial water wells in the area.

A Preliminary Assessment, EPA Form T2070-2, (see Attachment F) was conducted for the UCC facility on April 1, 1980. Section V.C.4. notes the burial of asbestos mats by a previous owner of the facility, but does not mention the location of the burial. Another form (see Attachment G) states the location and the amount of asbestos buried. File information concerning the condition of the asbestos landfill after April 1, 1980 is lacking.

FIT recommends a site inspection to determine the present condition of

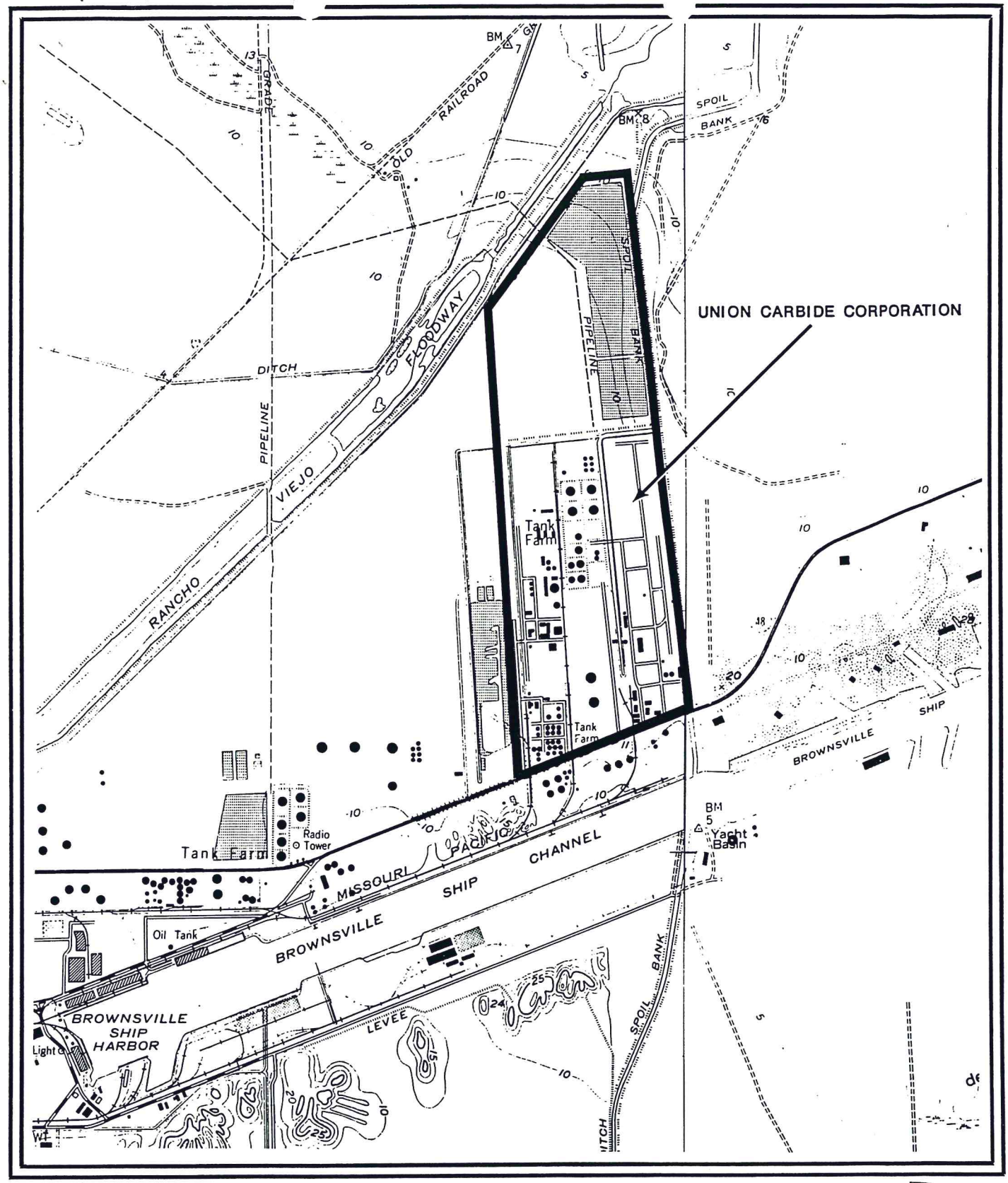
June 28, 1988

Union Carbide Corporation PA Reassessment
Brownsville, TX
Cerclis No. TXD008114092
TDD No. F-6-8805-10
PAN No. FTX0766PAA

the facility and the condition of the asbestos landfill and to ascertain potential hazards to surface and ground waters in the vicinity. FIT also recommends a water well reconnaissance within 3 miles of the facility. FIT recommends further investigation into the disposal practices of UCC concerning the ash from the incinerator.

TDP/tdp

ICF



N

0 2000 ft.

SCALE 1 : 24000

SITE LOCATION MAP

UNION CARBIDE CORPORATION

BROWNSVILLE, TX

CERCLIS NO. TXD008114092

TDD NO. F-6-8805-10

PAN NO. FTX0766PAA

QUADRANGLE LOCATION

EAST BROWNSVILLE, TEX.

PALMITO HILL, TEX.

ATTACHMENT A

FIT → NOTE

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by Hq)
6	TX 00639

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (*Section II*). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Tack Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET (or other identifier)		
Union Carbide (formerly Brownsville Plt.)	Port of Brownsville		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Brownsville	Texas	78520	Cameron

G. SITE OPERATOR INFORMATION

1. NAME	2. TELEPHONE NUMBER		
Union Carbide Corp. - Chemical & Plastics	(512) 831-4501		
3. STREET	**4. CITY**	**5. STATE**	**6. ZIP CODE**
Port of Brownsville	Brownsville	Texas	78520

H. REALTY OWNER INFORMATION (*If different from operator of site*)

1. NAME	2. TELEPHONE NUMBER	
Brownsville Navigation District	(512) 831-4592	
3. CITY	**4. STATE**	**5. ZIP CODE**
Brownsville	Texas	78520

I. SITE DESCRIPTION Clay lined pit (app. 200' X 200' X 10' deep) formerly used to dispose of iron oxide, ball mill residue, caustic soda - closed 1975.

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☒ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☐ 5. PRIVATE

II. TENTATIVE DISPOSITION (*complete this section last*)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (*mo., day, & yr.*)	B. APPARENT SERIOUSNESS OF PROBLEM
2-10-81	☐ 1. HIGH ☐ 2. MEDIUM ☒ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (*mo., day, & yr.*)
John Sturgis	(512) 968-3165	02-12-81

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME	2. TITLE	
John Sturgis	District Supervisor	
3. ORGANIZATION		**4. TELEPHONE NO. (*area code & no.*)**
TDWR		(512) 968-3165

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
John Sturgis	TDWR	(512) 968-3165
K. G. Townsend	Union Carbide	(512) 831-4501
Wesley McCoy	TDWR	(512) 968-3165

C. SITE REPRESENTATIVES INTERVIEWED (*corporate officials, workers, residents*)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
K. G. Townsend	Safety, Health & Environmental Affairs	Union Carbide - P. O. Box 3370 Brownsville, Texas 78520

Larry Wright DATE 6-17-81

Continued From Front

III. INSPECTION INFORMATION *(continued)*

D. GENERATOR INFORMATION *(sources of waste)*

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Brownsville Plant	Unknown	Unknown (closed 1957)	Unknown
Union Carbide	(512) 831-4501	P. O. Box 3370, Brownsville,Tx 78520	Ball mill residue sodium hydroxide, evap. scale.

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
N/A			

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
N/A		

G. DATE OF INSPECTION *(mo., day, & yr.)*	H. TIME OF INSPECTION	I. ACCESS GAINED BY: *(credentials must be shown in all cases)*
2-11-81	2:30 P	[X] 1. PERMISSION [ ] 2. WARRANT

J. WEATHER *(describe)*
Clear, warm (87°F)

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN *(mark 'X')*	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER		No samples collected	
b. SURFACE WATER			
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER *(specify)*			

B. FIELD MEASUREMENTS TAKEN *(e.g., radioactivity, explosivity, PH, etc.)*.

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
No field measurements	taken	

Continue On Page 3

Continued From Page 2

IV. SAMPLING INFORMATION *(continued)*

C. PHOTOS

1. TYPE OF PHOTOS: ☐ a. GROUND ☒ b. AERIAL

2. PHOTOS IN CUSTODY OF: Union Carbide officials

D. SITE MAPPED?

☒ YES. SPECIFY LOCATION OF MAPS: Union Carbide Plant @ Port of Brownsville.

E. COORDINATES

1. LATITUDE *(deg.-min.-sec.)*: 25° 58' 19"

2. LONGITUDE *(deg.-min.-sec.)*: 97° 22' 21"

V. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE *(Those inductrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*

☒ 2. INACTIVE *(Those sites which no longer receive wastes.)*

☐ 3. OTHER *(specify)*: _____ *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

☒ 1. NO ☒ 2. YES *(specify generator's four-digit SIC Code)*: 2869

Brownsville plant facility closed down in 1957, U.C. still in operation.

C. AREA OF SITE *(in acres)*: < 1.0 Ac.

D. ARE THERE BUILDINGS ON THE SITE?

☒ 1. NO ☐ 2. YES *(specify)*:

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity*(ies)* and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION	X	1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER *(specify)*:		6. OTHER *(specify)*:		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER *(specify)*:
					9. OTHER *(specify)*:		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

☐ 1. STORAGE ☐ 2. INCINERATION ☒ 3. LANDFILL ☐ 4. SURFACE IMPOUNDMENT ☐ 5. DEEP WELL

☐ 6. CHEM/BIO/PHYS TREATMENT ☐ 7. LANDFARM ☐ 8. OPEN DUMP ☐ 9. TRANSPORTER ☐ 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

☐ 1. LIQUID ☒ 2. SOLID ☒ 3. SLUDGE ☐ 4. GAS

B. WASTE CHARACTERISTICS

☒ 1. CORROSIVE ☐ 2. IGNITABLE ☐ 3. RADIOACTIVE ☐ 4. HIGHLY VOLATILE

☐ 5. TOXIC ☐ 6. REACTIVE ☒ 7. INERT ☐ 8. FLAMMABLE

☐ 9. OTHER *(specify)*:

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Yes - for Union Carbide (inventories)

Continue On Reverse

Continued From Front

VII. WASTE RELATED INFORMATION (continued)

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: Unknown	AMOUNT:	AMOUNT:	AMOUNT: Unknown	AMOUNT: 3000	AMOUNT:
UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE: Cu. Yds.	UNIT OF MEASURE:
					X (1) LABORATORY, PHARMACEUT.
			X (1) ACIDS		
	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS		X (1) FLYASH	
(1) PAINT, PIGMENTS					
(2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	X (2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	X (3) CAUSTICS	(3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	X (6) OTHER (specify): Iron catalyst of Fe_2O_3	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER (specify):		

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X')			3. TOXICITY (mark 'X')				4. CAS NUMBER	5. AMOUNT	6. UNIT
	a. SOLID	b. LIQ.	c. VAPOR	a. HIGH	b. MED.	c. LOW	d. NONE			
Asbestos	X					X			Unknown	

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

☐ A. HUMAN HEALTH HAZARDS

Continue On Page 5

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☐ J. CONTAMINATION OF AIR

☐ K. NOTICEABLE ODORS

☐ L. CONTAMINATION OF SOIL

☐ M. PROPERTY DAMAGE

Continue On Page 7

Continued From Page 6

VIII. HAZARD DESCRIPTION *(continued)*

☐ N. FIRE OR EXPLOSION

☐ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

☐ P. SEWER, STORM DRAIN PROBLEMS

☐ Q. EROSION PROBLEMS

☐ R. INADEQUATE SECURITY

☐ S. INCOMPATIBLE WASTES

Continue On Reverse

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA *(continued)*

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH *(specify unit)*	3. LOCATION *(proximity to population/buildings)*	4. NON-COMMUNITY *(mark 'X')*	5. COMMUNITY *(mark 'X')*
		None		

I. RECEIVING WATER

1. NAME: N/A

☐ 2. SEWERS ☐ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER *(specify)*:

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type*(s)* of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK *(specify below)*	'X'	C. OTHER *(specify below)*
	1. SAND				
X	2. CLAY				
	3. GRAVEL				

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH *(100,000 to 1000 cm/sec.)* ☐ C. HIGH *(1000 to 10 cm/sec.)*

☐ D. MODERATE *(10 to .1 cm/sec.)* ☒ E. LOW *(.1 to .001 cm/sec.)* ☐ F. VERY LOW *(.001 to .00001 cm/sec.)*

G. RECHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

H. DISCHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE: None

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: Coastal Flats

J. OTHER GEOLOGICAL DATA

Continue On Reverse

LANDFILLS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc)*
☐ YES ☒ NO

2. EVIDENCE OF IMPROPER DISPOSAL OF BULK LIQUIDS, SEMI-SOLIDS AND SLUDGES INTO THE LANDFILL
☐ YES ☒ NO

3. CHECK RECORDS OF CELL LOCATION AND CONTENTS AND BENCHMARK
☒ YES ☐ NO

4. WASTES SURROUNDED BY SORBENT MATERIAL
☐ YES ☒ NO

5. DIVERSION STRUCTURES ARE EFFECTIVELY CONSTRUCTED AND PROPERLY MAINTAINED
☒ YES ☐ NO

6. EVIDENCE OF PONDING OF WATER ON SITE
☐ YES ☒ NO

7. EVIDENCE OF IMPROPER/INADEQUATE DRAINING
☐ YES ☒ NO

8. ADEQUATE LEACHATE COLLECTION SYSTEM *(If "Yes", specify Type)*
☐ YES ☒ NO Wastes are reportedly encapsulated in clay formation.

8a. SURFACE LEACHATE SPRING
☐ YES ☒ NO

9. RECORDS OF LEACHATE ANALYSIS
☒ YES ☐ NO

10. GAS MONITORING
☐ YES ☒ NO

11. GROUNDWATER MONITORING WELLS
☒ YES ☐ NO Pre-existing wells, into ground water down the hydraulic gradient from the site have been analyzed.

12. ARTIFICIAL MEMBRANE LINER INSTALLED
☐ YES ☒ NO

13. SPECIFIC CONTAINMENT MEASURES *(Clay Bottom, Sides, etc)*
☒ YES ☐ NO Encapsulated in clay formation.

14. FIXATION *(Stabilization)* OF WASTE
☐ YES ☒ NO

15. ADEQUATE CLOSURE OF INACTIVE PORTION OF FACILITY
☒ YES ☐ NO

16. COVER *(Type)*
Compacted clay

16a. THICKNESS
5'

16b. PERMEABILITY
$< 1 \times 10^{-7}$ cu/sec.

16c. DAILY APPLICATION
☐ YES ☒ NO

ATTACHMENT B

31108

RECEIVED

MAY 24

ENFORCEMENT
FIELD OPERATIONS

UNION CARBIDE CORPORATION
COATINGS MATERIALS DIVISION
P.O. BOX 3370, BROWNSVILLE, TEXAS 78520

May 17, 1982

Mr. Harvey Davis, Executive Director
Texas Department of Water Resources
P. O. Box 13087, Capitol Station
Austin, Texas 78711

Solid Waste Registration No. 31108 and
Part A Hazardous Waste Permit Application
Cameron County

Dear Mr. Davis:

This letter is in response to your letter of February 23, 1982.

By means of this letter, we hereby notify you that we have installed a ground-water monitoring system for our surface impoundment in conformance with TDWR Rule 156.22.12.002. The wells were installed on May 4-6 by NFS/National Soil Services, Inc. in accordance with the guidelines received by our Messrs. J. L. Wyatt, K. G. Townsend, and W. H. Davies from Greg Tipple and J. G. Stadler of your Solid Waste Section at their technical conference on April 16.

A copy of NFS' well installation report is enclosed for your information.

In a forthcoming separate letter, we shall request a partial waiver concerning TDWR Rules 156.22.12.003-.005.

If you need further information, please contact Mr. W. H. Davies at (512) 831-4501, Extension 2281.

Very truly yours,

W. W. McManus by
R C Clark
Assistant
Plant Manager

W. W. McManus
Plant Manager

WWM:mr
Att.
Via Certified Mail, Return Receipt Requested
Cc: Mr. Brian Dixon
Mr. John Sturgis w/att.
Mr. Greg Tipple w/att.

RECEIVED
JUN 8 1982
CR/TDWR

NATIONAL SOIL SERVICES, INC. •
CONSULTING ENGINEERS
5814 HEFFERNAN STREET
HOUSTON, TEXAS 77087
713/644-9161, TWX: 910-881-5462

Report No. 8262
May 11, 1982

Union Carbide Corporation
Coatings Materials Division
P. O. Box 3370
Brownsville, TX 78520

Attention: Mr. W. H. Davies

MONITOR WELL INSTALLATION
WASTE PROCESSING AREA
BROWNSVILLE, TEXAS

Gentlemen:

Submitted here is our report on installation procedures and details for the recently completed monitor wells around the above referenced facility. Locations and general construction details of the wells were previously discussed with the Texas Department of Water Resources. Three wells were located to monitor potential seepage from the facility through the shallow sand stratum and a fourth well was located at a greater distance to monitor baseline conditions. This work was authorized by Purchase Order No. 526-344-016-4.

Monitor wells were installed at locations shown on Plate 1. Soil samples were obtained at each location to verify depth limits of the shallow sand stratum. Descriptions of the soils encountered and well installation details are shown on the logs of borings, Plates 2 through 5.

Drilling was done by the wash boring method using drill water obtained from the plant drinking water supply. Eight inch steel casing was set

ATTACHMENT

through the near surface fill soils prior to drilling into the sand stratum. After setting the casing to depths ranging from five to 12 feet, the boreholes were flushed with clear water, and then advanced to completion depths. The steel casing was extracted on completion of backfilling. An air compressor equipped with a filter was used to develop all wells.

We appreciate the opportunity to assist you on this project. Please call upon us if we can be of further assistance.

Very truly yours,

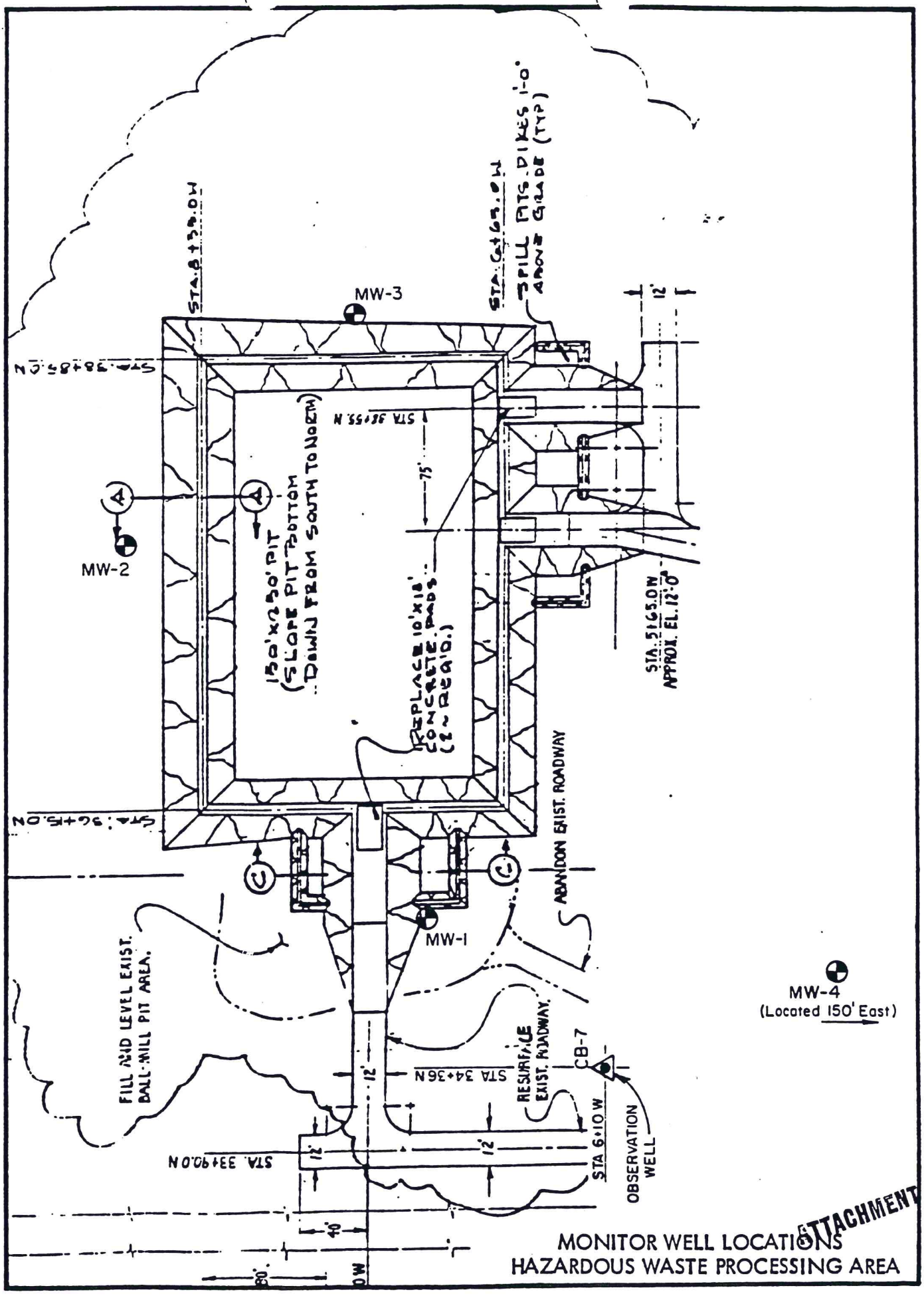
NFS SERVICES, INC.

Darryl E. Carlson
Chief Geologist

DEC/dp

Copies submitted: 5

ATTACHMENT



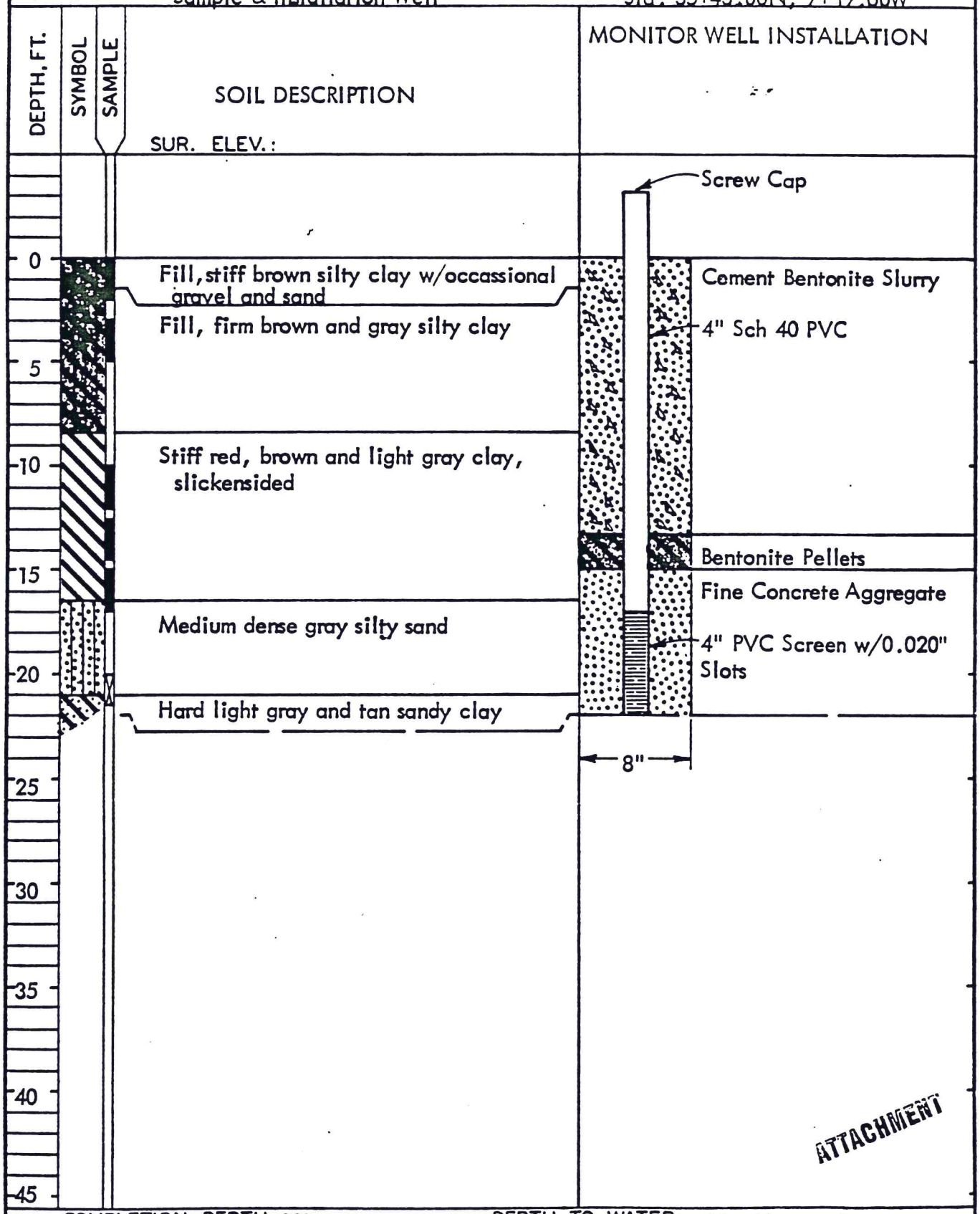
MONITOR WELL LOCATIONS
HAZARDOUS WASTE PROCESSING AREA

ATTACHMENT

LOG OF BORING NO. MW-1

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 35+43.00N, 7+19.00W



COMPLETION DEPTH: 22'
DATE: May 6, 1982

DEPTH TO WATER: Not Measured
DATE:

ATTACHMENT

LOG OF BORING NO. MW-2

MONITOR WELLS
HAZARDOUS WASTE PROCCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 37+81.00N, 8+86.00W

DEPTH, FT.	SYMBOL	SAMPLE	SOIL DESCRIPTION	MONITOR WELL INSTALLATION
			SUR. ELEV.:	
0			Firm gray, red and brown silty clay w/roots to 1'	Screw Cap; Cement Bentonite Slurry
5			- brown, red and gray w/occassional organic traces below 4'	4" Sch 40 PVC
10			- w/occassional silt seams and laminations 9.5' - 11'	Bentonite Pellets; Fine Concrete Aggregate
15			Medium dense gray silty sand	4" PVC Screen w/0.020" Slots
			Very stiff light gray and tan sandy clay w/ferrous stains to 17' - Hard below 18'	8"
20				
25				
30				
35				
40				
45				

ATTACHMENT

COMPLETION DEPTH: 19.5'
DATE: May 4, 1982

DEPTH TO WATER: 5.9'
DATE: May 6, 1982

LOG OF BORING NO. MW-3

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 39+12.00N, 7+57.00W

DEPTH, FT.	SYMBOL	SAMPLE	SOIL DESCRIPTION	MONITOR WELL INSTALLATION
			SUR. ELEV.:	
0			Fill, stiff brown and light gray silty clay w/ sand and gravel	Screw Cap; Cement Bentonite Slurry
5			Firm brown and light gray silty clay w/traces calcareous material to 6' - stiff below 7' - w/occassional silt pockets below 8'	4" Sch 40 PVC
10			- very stiff below 12'	Bentonite Pellets
15			Medium dense gray silty sand	Fine Concrete Aggregate; 4" PVC Screen w/0.020" Slots
20			Very stiff light gray and tan sandy clay w/occassional sand seams and laminations	8"
25				
30				
35				
40				
45				

COMPLETION DEPTH: 19.5'
DATE: May 5, 1982

DEPTH TO WATER: Not Measured
DATE:

ATTACHMENT

LOG OF BORING NO. MW-4

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well
LOCATION: Sta 34+98.00N, 3+30.00 W.

DEPTH, FT.	SYMBOL	SAMPLE	SOIL DESCRIPTION	MONITOR WELL INSTALLATION
			SUR. ELEV.:	
0			Fill, stiff gray and tan silty clay w/sand and gravel	Screw Cap; Cement Bentonite Slurry; 4" Sch 40 PVC
5			Firm brown silty clay w/occassional calcareous nodules to 6.5'	
10			- stiff w/occassional silt pockets and laminations below 10'	Bentonite Pellets; Fine Concrete Aggregate
15			Medium dense gray silty sand	4" PVC Screen w/0.020" Slots
20			Hard light gray and tan sandy clay w/occasional ferrous stains	8"
25				
30				
35				
40				
45				

COMPLETION DEPTH: 19.5'
DATE: May 5, 1982

DEPTH TO WATER: Not Measured
DATE:

Last ATTACHMENT 5-17-82

ATTACHMENT C

TWC ... -...-A
o7h3

TEXAS WATER COMMISSION

Paul Hopkins, Chairman
Ralph Roming, Commissioner
John O. Houchins, Commissioner

Larry R. Soward, Executive Director
Mary Ann Hefner, Chief Clerk
James K. Rourke, Jr., General Counsel

June 22, 1987

Mr. Allen C. Booth
Union Carbide Corporation
Engineering, Manufacturing and
Technology Service Department
Health, Safety and Environmental Technology
P. O. Box 8361
South Charleston, WV 25303

Re: Union Carbide Corporation, Brownsville Plant
Solid Waste Registration No. SW-31108
Comprehensive Ground Water Monitoring Evaluation

Dear Mr. Booth:

The subject facility was inspected on November 11, 1986 by representatives of our Austin and District 11 offices. This inspection included a Comprehensive Ground Water Monitoring Evaluation (CME). The purpose of the CME is to determine the adequacy of a site's interim status ground-water monitoring program. This review has been completed for this facility and it is the opinion of our technical staff that the ground-water contamination documented by TWC co-sampling results constitutes a violation of the Texas Administrative Code and Chapter 26 of the Texas Water Code and for which formal enforcement action may be taken:

31 TAC 335.4/Texas Water Code Chapter 26.121 - TWC co-sampling results indicate the release of numerous solid waste constituents into the ground water in the vicinity of the Ball Mill Residue Basin Waste Management Unit.

A discrepancy in the analytical results reported to the Commission was also noted. The TWC chloride results from the co-sampling of the RCRA monitor wells were significantly less than those reported by the facility.

The facility sampling and analysis plan should be augmented and updated to reflect that ground-water samples collected for Total Organic Carbon (TOC) should be preserved with either hydrochloric or sulfuric acid in the field or should be analyzed within 7 days of sample collection.

Within 30 days of receipt of this letter, submit to the RCRA Ground Water Enforcement Unit for review the following:

1. A ground-water quality investigation plan capable of determining the rate and extent of solid waste constituent migration in the uppermost and all hydraulically-connected lower aquifers;

2. A revised sampling and analysis plan to reflect the proper handling of TOC samples; and,

3. Corrected chloride concentration values for all four assessment sampling events.

If you have any question regarding the above, please contact Carol Boucher at (512)463-8425.

Sincerely,

Thomas P. Robb for

Samuel B. Pole, Chief
Hazardous and Solid Waste Enforcement Section
Hazardous and Solid Waste Division

CB:cb

cc: TWC District 11 office
Scott Huling, TWC H&SW Permits Section
TWC H&SW Reports and Management Section

ATTACHMENT D

TEXAS WATER COMMISSION

Joe D. Carter, Chairman
O. F. Dent, Commissioner
H. A. Beckwith, Commissioner

BULLETIN 6305

RECONNAISSANCE INVESTIGATION OF THE GROUND-WATER RESOURCES OF THE GULF COAST REGION, TEXAS

By

Leonard A. Wood, R. K. Gabrysch, and Richard Marvin
United States Geological Survey

Prepared by the U.S. Geological Survey
in cooperation with the
Texas Water Commission

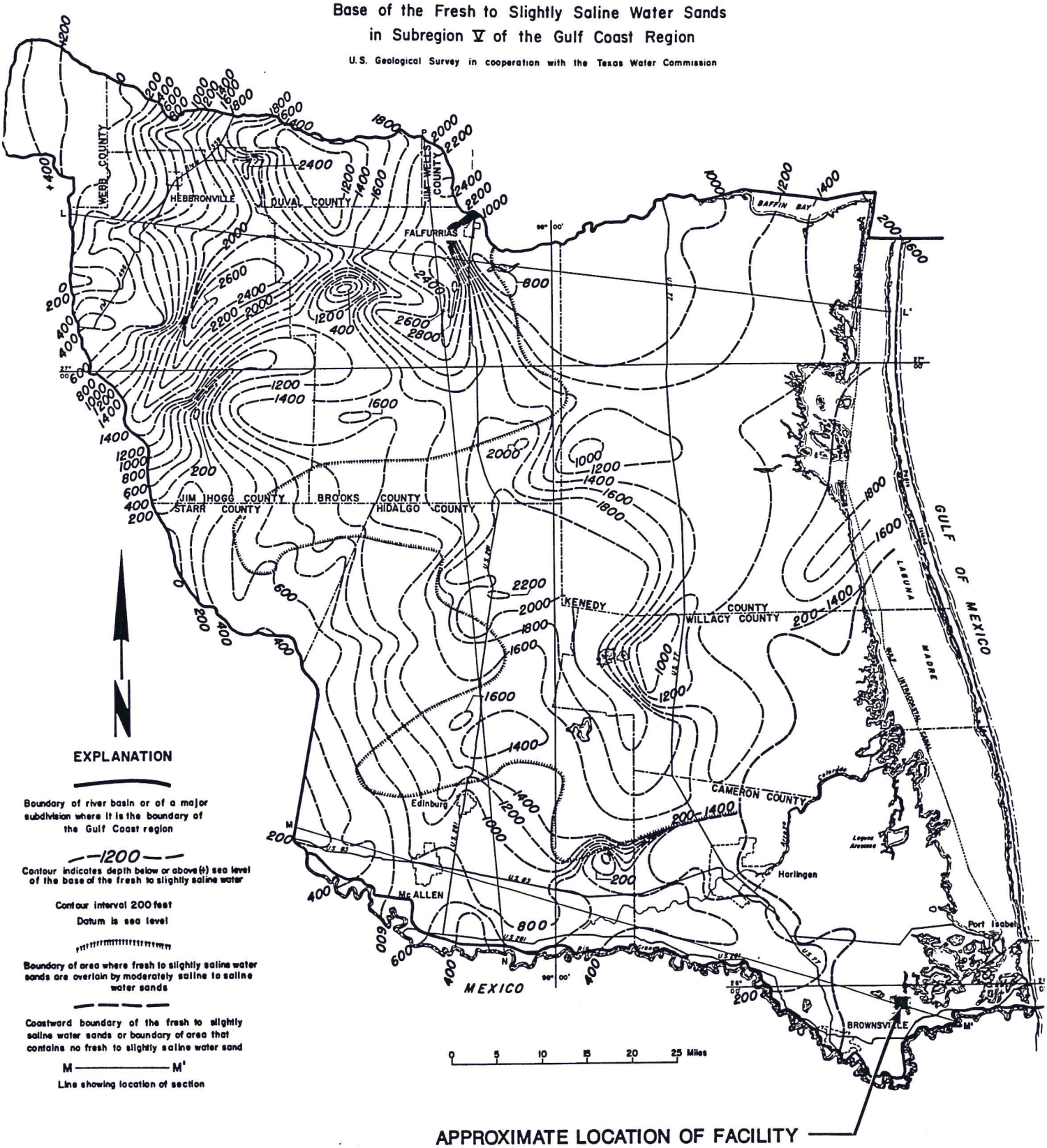
June 1963

Second Printing November 1971
by
Texas Water Development Board

UNION CARBIDE CORPORATION
BROWNSVILLE, TEXAS

Base of the Fresh to Slightly Saline Water Sands in Subregion V of the Gulf Coast Region

U.S. Geological Survey in cooperation with the Texas Water Commission



EXPLANATION

Boundary of river basin or of a major subdivision where it is the boundary of the Gulf Coast region

1200

Contour indicates depth below or above (+) sea level of the base of the fresh to slightly saline water

Contour interval 200 feet

Datum is sea level

Boundary of area where fresh to slightly saline water sands are overlain by moderately saline to saline water sands

Coastward boundary of the fresh to slightly saline water sands or boundary of area that contains no fresh to slightly saline water sand

M — M'

Line showing location of section

APPROXIMATE LOCATION OF FACILITY

ATTACHMENT E

SE 8·10 51

EPA Notification of Hazardous Waste Site

TXS·000·001·402 000843

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9 1981

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies

A Person Required to Notify:

Enter the name and address of the person or organization required to notify

Name: Union Carbide Corporation
Street: 270 Park Avenue
City: New York State: NY Zip Code: 10017

B Site Location: TXD 00-811409 2 OE

Enter the common name (if known) and actual location of the site.

HAZ-TX00639 6K

Name of Site: Union Carbide Corporation - Turning Basin
Street: TX Highway 48, Port of Brownsville
City: Brownsville County: Cameron State: TX Zip Code: 78520

C Person to Contact:

Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title): Parker, Dr. H.M., Tech. Mgr. Environmental Affairs
Phone: 212-551-4515

D Dates of Waste Handling:

Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year): 1950 To (Year): 1957

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☒ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify)

Known contents Iron Oxide catalyst, non-hazardous

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☒ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary/Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved
OMB No. 2060 0138

Notification of Hazardous Waste Site — Side Two

Waste Quantity:

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☐ Landfill
4. ☐ Tanks
5. ☒ Impoundment
6. ☒ Underground Injection *
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet 17,000

gallons unknown

Total Facility Area

square feet unknown

acres

*Contents Unknown

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☐ I
X Unlikely

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and asse hazardous waste sites. Although completing the items is not required, you are encouraged to do so.

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publish map showing the site location.

See attached map, which was included in our hazardous waste permit application submitted on November 10, 1980, to the EPA's Region VI Office in Dallas.

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Union Carbide Corporation began using its surface impoundment site in 1975. This general area had also been used by AMOCO during the 1950's for waste and scrap disposal. The natural clays found in this area have a suitable plasticity index for waste impoundment and permeability meets state requirements.

Test wells drilled by the Texas Water Development Board and City of Brownsville found no potable water source within eight miles of the plant site.

*Underground injection used by Amoco, date and contents unknown.

JFW2

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other".

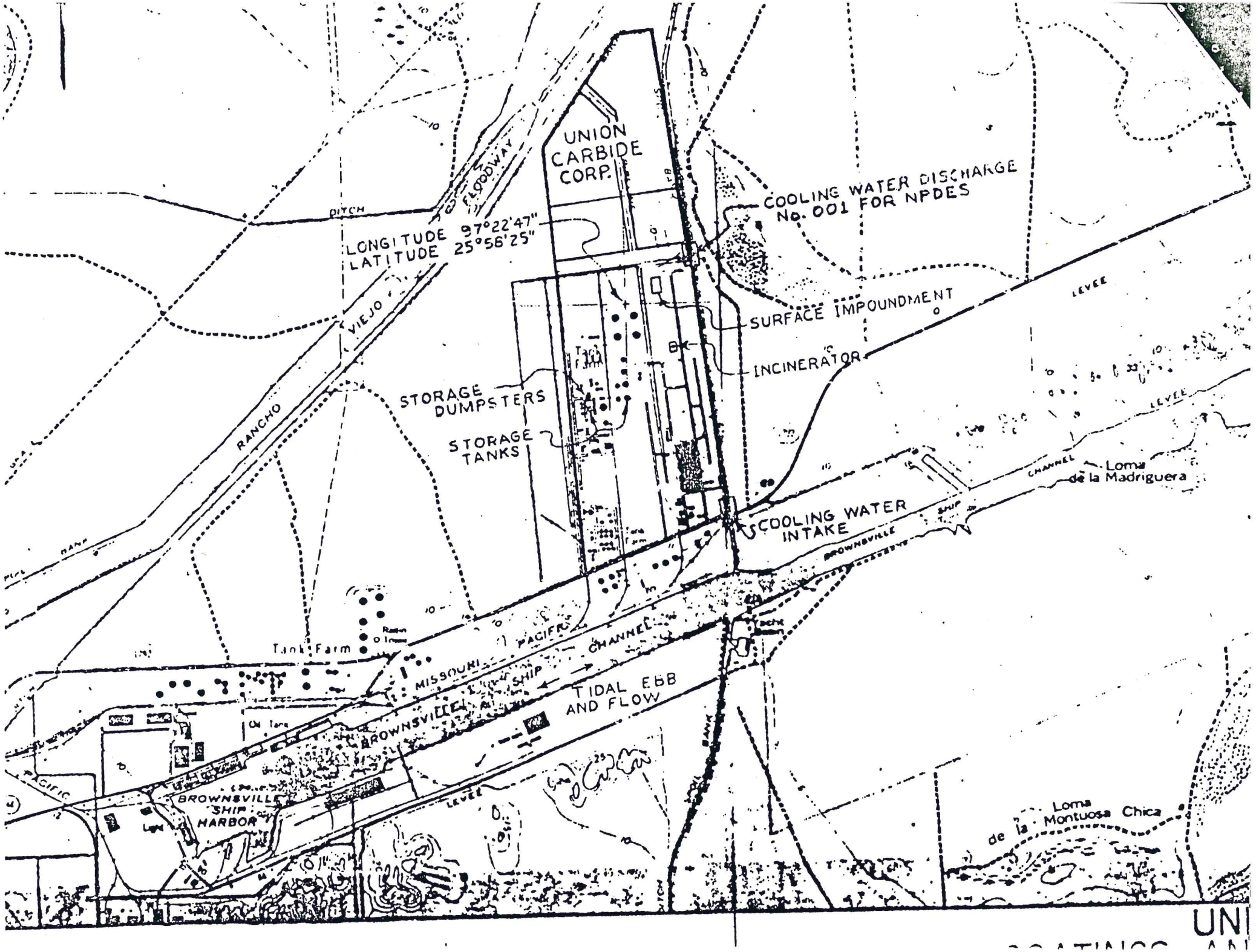
Name W. W. McManus, Plant Manager

Street P.O. Box 3370

City Brownsville State TX Zip Code 78520

Signature W. W. McManus Date May 15, 1981

- ☒ Owner, Preser
- ☒ Owner, Past
- ☐ Transporter
- ☒ Operator, Pres
- ☒ Operator, Past
- ☐ Other


UNION CARBIDE CORP.
COOLING WATER DISCHARGE No. 001 FOR NPDES
LONGITUDE 97°22'47"
LATITUDE 25°56'25"
FLOODWAY
DITCH
VIEJO
RANCHO
SURFACE IMPOUNDMENT
INCINERATOR
STORAGE DUMPSTERS
STORAGE TANKS
LEVEE
COOLING WATER INTAKE
CHANNEL
Loma de la Madriguera
Tank Farm
MISSOURI PACIFIC
SHIP CHANNEL
TIDAL EBB AND FLOW
BROWNSVILLE SHIP HARBOR
Loma de la Montuosa Chica

ATTACHMENT F

TX00639

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT

EPA

REGION	SITE NUMBER (to be assigned by Hq)
6	~~TX05096~~

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II (*Preliminary Assessment*). File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME
Brownsville Plant

B. STREET (or other identifier)

C. CITY
Brownsville

D. STATE
Tx.

E. ZIP CODE
78520

F. COUNTY NAME
Cameron

G. OWNER/OPERATOR (If known)

1. NAME
Amaco, Hydrocol, ITS

2. TELEPHONE NUMBER

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4 MUNICIPAL ☒ 5 PRIVATE ☐ 6 UNKNOWN

I. SITE DESCRIPTION
An 11 acre lagoon, a one-acre solid waste site, and an injection well were utilized for waste disposal.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)
Waste disposal site survey
House of Representatives, 96th Congress

K. DATE IDENTIFIED (mo., day, & yr.)
10/79

L. PRINCIPAL STATE CONTACT

1. NAME
Gary Schroeder

2. TELEPHONE NUMBER
(512) 475-6371

II. PRELIMINARY ASSESSMENT (complete this section last)

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4 NONE ☐ 5 UNKNOWN

B. RECOMMENDATION

☒ 1. NO ACTION NEEDED (*no hazard*)

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: _____
b. WILL BE PERFORMED BY: _____

☐ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: _____
b. WILL BE PERFORMED BY: _____

☐ 4. SITE INSPECTION NEEDED (*low priority*)

C. PREPARER INFORMATION

1. NAME
Charles Rhodes

2. TELEPHONE NUMBER
(512) 968-3165

3. DATE (mo., day, & yr.)
4/1/80

III. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE (*Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if intre-quently.*)

☒ 2. INACTIVE (*Those sites which no longer receive wastes.*)

☐ 3. OTHER (*specify*): _____ (*Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.*)

B. IS GENERATOR ON SITE?

☒ 1. NO ☐ 2. YES (*specify generator's four-digit SIC Code*): _____

C. AREA OF SITE (*in acres*)
12

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE (*deg.-min.-sec.*)

2. LONGITUDE (*deg.-min.-sec.*)

E. ARE THERE BUILDINGS ON THE SITE?

☒ 1. NO ☐ 2. YES (*specify*): _____

Continue On Reverse

Continued From Page 2

V. WASTE RELATED INFORMATION (continued)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

Asbestos
Acids
Iron Catalyst

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

The asbestos is in 2-foot thick mats buried beneath 3-4 feet of dirt, elevation about 15 ft. above msl. Area of disposal = 200 feet X 200 feet. Acids were disposed of by underground injection. Fe_2O_3 is basically inert, non hazardous.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH				
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY				
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER				
8. CONTAMINATION OF SURFACE WATER				
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL				
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify): See site description page attached.				

SITE DESCRIPTION

Make additional comments or narrative description of situation known or reported to exist at the site based on file review. Include dates and description of any incidents documented in file.

TDWR Interoffice Memo (1-8-80) subject "Waste Disposal Site Survey" indicated that in the past this site served as for disposal for three companies: Amoco, Hydrocol and ITS. These three companies were involved in a government subsidized project developed for the manufacturing and marketing of gasoline and organic chemicals from natural gas.

Apparently, a disposal well was utilized; however, little is known about the well except that it was situated on Brownsville Navigation District property under lease to Amoco.

Two pits, reportedly used as oil separation facilities, have been filled in to grade.

No problems have come to light relative to these facilities. Water quality in the nearby Brownsville Ship Channel is well within established TDWR water quality standards.

ATTACHMENT G

UNION CARBIDE CORPORATION - CHEMICALS AND PLASTICS

SURVEY OF WASTE SITES - ECKHARDT QUESTIONNAIRE

BROWNSVILLE PLANT

FORM	INFORMATION SOURCE				INFORMATION TYPE		
	MANAGER	SUPERVISOR	EMPLOYEE	RETIREE	RECORDS	ESTIMATE	MEMORY
A - General Facility Info.	X				X		
B - Disposal Site Info.							
On-Site	X		X		X		X
Contractor	X				X		
Contractor							
Contractor							
Contractor							
Contractor							
Contractor							
C - Hauler Info.	X				X		
D - Supplemental Hauler Info.							
Hauler							
Hauler							

INSTRUCTIONS

1 - Under B list name of On-site Facility (Ex. - Ponce Plant).
2 - Under B list name of Contractor (Ex. NEWCO).
3 - Under D list Haulers or Disposers who took process waste from your facility to an unknown location.

COMMENT

Groups interviewed have been encouraged to speculate on contents and quantities rather than list as unknow.

TXD-000-001-626

FORM B: DISPOSAL SITE INFORMATION

(DO NOT USE) (1-8)

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: * AMOCO (NOW KNOWN AS UNION CARBIDE CORP.)
Facility Name: BROWNSVILLE PLANT
Name of Site: BROWNSVILLE PLANT
Address of Site: PORT OF BROWNSVILLE PLANT
no. street

✓TXD-00-811-4092 /
HAZ-TX00639

BROWNSVILLE TX 78520
city state zip code

Name of Owner (while used by facility): AMOCO
Address:
no. street

city state zip code

Current Owner (if different from above):
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site) ..... [1] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [1] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[5][7] (13-14)
4. Year first used for process waste from this facility ..... 19[5][0] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[5][7] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ][ ][ ][ ][ ][ ][9] (19-26)
   hundred tons ..... [ ][ ][ ][ ][ ][ ][9] (27-33)
   thousand cubic yards ..... [ ][ ][ ][ ][ ][ ][2] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)

landfill, mono industrial waste	[2]	(42)
landfill, mixed industrial waste	[2]	(43)
landfill, drummed waste	[9]	(44)
landfill, municipal refuse co-disposed	[9]	(45)
pits/ponds/lagoons	[2]	(46)
deep well injection	[2]	(47)
land farming	[3]	(48)
incineration	[2]	(49)
treatment (eg. neutralizing)	[9]	(50)
reprocessing/recycling	[9]	(51)
other (specify)_____	[9]	(52)

8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [1] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

Company Name: AMOCO

Facility Name: BROWNSVILLE PLANT

Site Name: PORT OF BROWNSVILLE PLANT

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	1	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	1	(15)
Base solutions, with pH>12	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	2	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	1	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >50pico curies/gram	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	2	(34)
insecticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	2	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	2	(42)
amides, amines, imides	2	(43)
plastizers	2	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	2	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	2	(52)
oils and oil sludges	1	(53)
esters and ethers	1	(54)
alcohols	1	(55)

(1-5)
(DO NOT USE)

FORM C: HAULER INFORMATION

PROVIDE A COMPLETE LIST OF ALL FIRMS AND INDEPENDENT CONTRACTORS, INCLUDING THE COMPANY AND ITS AFFILIATES AND SUBSIDIARIES, USED TO REMOVE PROCESS WASTES FROM THIS FACILITY SINCE 1950.

Company Name: UNION CARBIDE CORPORATION, CHEMICALS AND PLASTICS

Facility Name: BROWNSVILLE PLANT

Name of Firm or Contractor	Address	ICC # (If Known)	Years Used
General Electric Service Shops	8800 Wallisville Rd. Houston, TX		1 *

* One shipment only.

UNION CARBIDE CORPORATION
COATINGS MATERIALS DIVISION
P.O. BOX 3370, BROWNSVILLE, TEXAS 78520

November 1, 1985

TO: Mr. Bryan W. Dixon, Director
Hazardous and Solid Waste Division
Texas Water Commission
P. O. Box 13087, Capitol Station
Austin, Texas 78711

From: Mr. W. W. McManus

Re: Closure of Union Carbide HWM
Units, Brownsville, Texas
Solid Waste Registration Number 31108
EPA I. D. Number TXD008114092

By submittal of this package to the Texas Water Commission (TWC), Union Carbide Corporation (UCC) announces its intention to discontinue interim status of all its hazardous waste management units at its Brownsville, Texas facility and proceed with RCRA closure.

This package is divided into four sections. The first section is a request to TWC to concur with UCC's conclusion that the Ball Mill Residue Basin (Sequence No. 01) is currently closed under RCRA regulations since the impoundment no longer contains hazardous wastes or hazardous waste residues. The second section is a request to TWC to review the results of groundwater monitoring around the Ball Mill Residue Basin and to determine if future groundwater monitoring and/or corrective action is necessary. The third section contains the closure plans for the Incinerator (Sequence No. 02), Tank 5326 (Sequence No. 03) and Tank 5211 (Sequence No. 04) for TWC approval prior to execution. The fourth section contains cost estimates for closure of the incinerator and tanks; along with, documentation demonstrating UCC's capability to cover the cost of closing said units.

Union Carbide understands that relinquishing interim status prevents these units from accepting hazardous waste after November 8, 1985. None of these units are currently in active service.

Union Carbide desires to close these units as soon as possible. Thus, UCC respectfully requests the TWC to expeditiously review this package.

If during the review, any questions or concerns arise, please do not hesitate to contact me (512-831-4501) immediately. At the conclusion of your review, UCC desires a meeting with your staff to discuss your conclusions and comments.

Respectfully yours,

W. W. McManus
Plant Manager

ACB:glc
2239F
bcc: A. C. Booth
O. H. Cunningham
J. B. Leverton
S. K. Phillips

CLOSURE OF BALL MILL RESIDUE BASIN

I. REQUEST

Union Carbide Corporation (UCC) requests the Texas Water Commission (TWC) to concur with UCC's designation of the Brownsville Plant Ball Mill Residue Basin as a closed hazardous waste surface impoundment. This judgment is based upon:

1. The basin no longer contains hazardous wastes since all the deposited hazardous wastes have lost their hazardous characteristics. No listed wastes were deposited in basin.

2. The underlying soil is not hazardous since it is not hazardous due to characteristics.

UCC believes the above scenario is sufficient to demonstrate achievement with the 31 TAC 335.286 performance standard in that no remaining material in the surface impoundment is hazardous due to characteristics.

II. BACKGROUND

Figure 1 provides a plan view of the residue basin. The basin was in operation from 1975 to mid-1983. The basin is roughly 150' x 250'. The maximum capacity is approximately 4200 cubic yards; however, the basin is presently only partially full. The basin is above grade with compacted clay dikes and in-situ clay bottom.

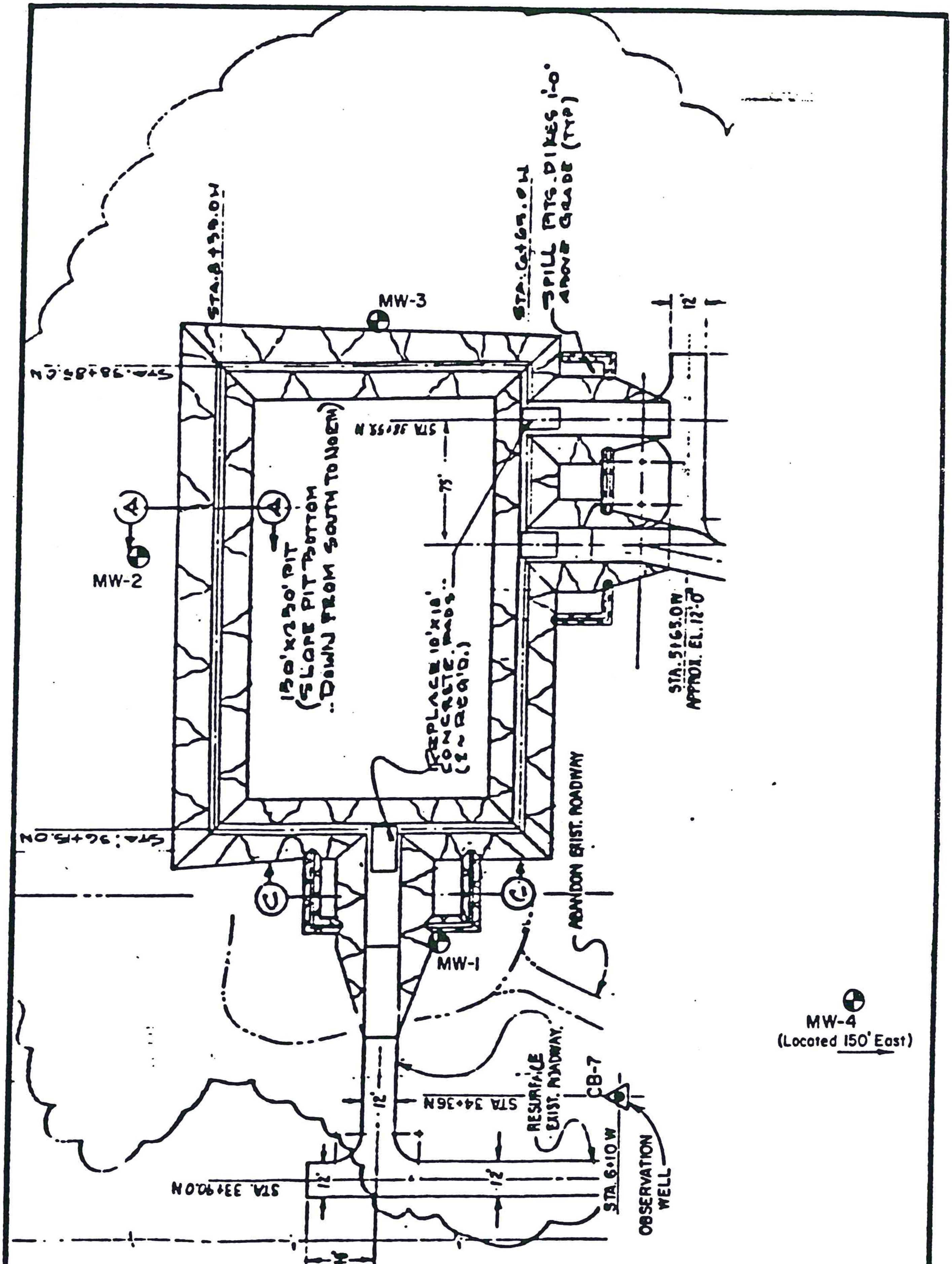

MW-1
MW-2
MW-3
MW-4
(Located 150' East)
CB-7
OBSERVATION WELL
ABANDON EXIST. ROADWAY
RESURFACE EXIST. ROADWAY
STA. 34+36N
STA. 33+90.0N
STA. 6+10W
STA. 96+15.0N
STA. 98+85.0N
STA. 8+50.0W
STA. 6+67.0W
STA. 5+65.0W
APPROX. EL. 12'-0"
SPILL PITS DIKES 1'-0" ABOVE GRADE (TYP.)
150'x250' PIT (SLOPE PIT BOTTOM DOWN FROM SOUTH TO NORTH)
REPLACE 10'x18' CONCRETE PADS (2 REQ'D.)

FIGURE 1

The basin has no liners. There are three unloading stations (one at south side; two on east side).

The basin received ~~seven~~ five residue streams, three of which were hazardous. The hazardous wastes were:

1. Ball Mill Residues--ignitable (D001); corrosive (D002); chromium (D007). [20% POA (DIAMMONIUM PHOSPHATE), 80% H_2O]

2. Sodium Hydroxide Solution--corrosive (D002); chromium (D007).

3. Wastewater Sludge--chromium (D007). FROM ACCUMULATION IN SUMPS

4. CARBON DEPOSITS FROM FIREBOX (CLASS II) ANHYDRIDE

5. EVAPORATOR SCALES (NACL) (CLASS I)

The last shipment of hazardous waste received by the basin occurred July 27, 1983.

III. JUSTIFICATION

In July 1985, Environmental Research and Technology, Inc. conducted a sampling/analysis program of the basin contents to determine if hazardous wastes remain in the basin. The full report of the program is attached.

Samples were taken of the impounded water, bottom sludge and underlying soil and analyzed for the hazardous characteristics that caused the incoming wastes to be hazardous. The results conclusively show that the material in the basin and the underlying soil are not RCRA hazardous.

ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.
12012 WICKCHESTER SUITE 200 HOUSTON, TEXAS 77079 (713) 558-8500

ERT Ref No. D866-230

September 25, 1985

Mr. Edward Robertson
Union Carbide Corporation
Solvents and Coatings Division
P. O. Box 3370
Brownsville, Texas 78520

Final Basin Field Report
Union Carbide Corporation
Brownsville, Texas

Dear Mr. Robertson:

On July 29 and 30, 1985, Environmental Research and Technology, Inc. (ERT) conducted a sampling program at the inactive ball mill basin at Union Carbide Corporation's (UCC) Brownsville Plant. The objective of the program was to collect a sufficient number of samples of the basin liquid, sludge and underlying soil to chemically characterize these materials. The results of the analyses of liquid and sludge samples have been used to determine the final course of action (i.e., paper closure, physical closure/post closure, permitting) at the basin for RCRA compliance. The results of the analyses of the soil samples have been used to assess potential leakage of contaminants from the basin into the subsurface. The remainder of this report presents detailed discussions of the sampling procedures and field activities and the results and conclusions of the sample analyses.

Sampling Procedures and Field Activities

Sampling was performed from a platform suspended over the basin by a crane. Initially, surface liquid samples and depth readings were taken at the four locations shown in Figure 1. Exact sampling locations were then

staked out for further sample collection. Samples collected during the field program include four surficial liquid samples, four liquid column samples, four sludge samples, and eight soil samples. The samples were not composited.

At each location field personnel collected a representative sample of the liquid column. At locations B-1 and B-2 (Figure 1), grab samples were obtained by immersing the containers into the shallow liquid. At locations B-3 and B-4 (Figure 1) a stoppered PVC tube was used to sample the liquid column. Field observations indicated a floating top liquid layer in the basin. This surficial layer was collected and analyzed to ensure there was no phase separation which could produce a low flash point liquid.

Following liquid collection, thickness of sludge at the bottom of the basin was determined by probing, and sludge samples were collected. Table 1 presents the thickness of the sludge layer. At locations B-1 and B-2, containers were immersed to carefully collect the full thickness of sludge. Excess liquid was then removed from the sampling container. At locations B-3 and B-4, sludge samples were collected using stoppered PVC pipe.

Following sludge sampling, four-inch PVC casing was driven through the sludge and seated approximately six inches into the underlying soil. The liquid and sludge were pumped out of the casing, and soil samples were obtained by driving a split-spoon sampler from 0 to 12 inches and from 12 to 24 inches. The upper and lower samples were retained separately. The borings were then grouted with a cement-bentonite mixture, and the casing was removed.

All samples were uniquely labeled upon collection to identify project name and number, sample number and type, sampling date and time, and name of ERT field personnel. A field log describing pertinent field data was kept by the ERT field supervisor.

Laboratory Analyses

Samples collected during the field program were analyzed by Pan American Laboratories in Brownsville, Texas. Samples were analyzed for the following parameters:

- o pH;
- o TOC;
- o Oil and Grease (O&G);
- o EP Toxicity; and
- o Flash Point.

Additionally, the moisture content of sludge and soil samples was determined. Flash points which were originally requested for liquid samples were not determined. Subsequently, UCC has collected additional surficial liquid samples which were submitted for determination of flash point. Analyses were performed in accordance with U.S. EPA analytical procedures.

Results and Conclusions

Analytical results for soil, sludge and liquid samples collected during the investigation are presented in Tables 2 through 4. Table 5 presents the maximum concentrations for characteristics of EP Toxicity for comparision with analytical results and the analytical detection limits.

Hazardous materials placed in the ball mill basin during its operation included wastes with concentrations of chromium in excess of 5.0 parts per million (ppm), low flash point (< 140°F) and corrosive material (ph $\geq$ 12.5). The laboratory analyses indicate that in no case did the concentration of metals in any sample exceed the EPA maximum concentration limit for EP Toxicity. Furthermore, values for pH are only slightly basic (pH $\leq$ 9.49) for all samples. Based on these analyses, the contents of the ball mill basin at present would not be classified as hazardous according to RCRA regulations.

Respectfully submitted,

Thomas M Johnson

Thomas M. Johnson
Senior Hydrogeologist

TMJ/ars
cc: Mr. Alan Booth

Table 1

Basin Sludge Thickness

Sampling Location	Depth to Sludge (in.)	Depth to Soil (in.)	Sludge Thickness (in.)
B-1	--	--	1.5
B-2	6.5	10	3.5
B-3	13.5	18	4.5
B-4	17	22	5.0

Table 2

Results of Soil Analyses

Parameter	Units	Sample Number[1]							
		SSB-1		SSB-2		SSB-3		SSB-4	
		upper[2]	lower[3]	upper	lower	upper	lower	upper	lower
pH	--	8.44	8.34	8.09	9.42	8.34	8.05	8.85	8.83
Oil and Grease	%	1.87	0.80	6.71	1.64	2.41	0.11	0.29	.009
TOC	ppm	13,600	19,600	24,120	24,120	22,610	11,310	18,090	5,280
Moisture Content	%	39.2	26.5	35.5	9.5	44.4	23.9	36.0	22.0
Flash Point	°F	>210	>210	>210	>210	>210	>210	>210	>210
EP Toxicity									
Selenium	ppm	ND[4]	ND	ND	ND	ND	ND	ND	ND
Silver	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Barium	ppm	ND	25[5]	ND	ND	ND	89[5]	ND	66[5]
Cadmium	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ppm	ND	ND	ND	ND	ND	0.004	ND	ND

Footnotes

1 See Figure 1 for sampling locations.
2 Upper samples from 0" to 12" depth
3 Lower samples from 12" to 24" depth
4 ND = Not Detected. See Table 5 for EPA maximum concentrations for EP Toxicity and analytical detection limits.
5 Barium believed to be a natural component of the underlying soil.

Table 3

Results of Sludge Analyses

Parameters	Units	Sample Number [1]			
		SLSB-1	SLSB-2	SLSB-3	SLSB-4
pH	--	9.36	9.22	8.89	9.10
Oil and Grease	%	1.56	10.85	0.72	2.45
TOC	ppm	10,550	17,340	19,600	13,750
Moisture Content	%	25.0	58.2	67.9	27.3
Flash Point	°F	>210	>210	>210	>210
EP Toxicity					
Selenium	ppm	ND[2]	ND	ND	ND
Silver	ppm	ND	ND	ND	ND
Arsenic	ppm	ND	ND	ND	ND
Barium	ppm	ND	ND	ND	ND
Cadmium	ppm	ND	ND	ND	ND
Chromium	ppm	ND	ND	ND	ND
Lead	ppm	ND	ND	ND	ND
Mercury	ppm	ND	ND	ND	ND

Footnotes:

[1] See Figure 1 for Sampling locations.

[2] ND = Not Detected. See Table 5 for EPA maximum concentrations for EP Toxicity and analytical detection limits.

Table 4

Results of Water Analyses

Parameters	Units	Sample Number[1]			
		WSB-1	WSB-2	WSB-3	WSB-4
pH	--	9.49	9.49	9.48	9.48
Oil and Grease	ppm	118	288	188	8572
TOC	ppm	2,375	2,170	2,315	3,627
Flash Point[2]	°F	>230	>230	>230	>230
EP Toxicity					
Selenium	ppm	ND[3]	ND	ND	ND
Silver	ppm	ND	ND	ND	ND
Arsenic	ppm	ND	ND	ND	ND
Barium	ppm	ND	ND	ND	ND
Cadmium	ppm	ND	ND	ND	ND
Chromium	ppm	3.15	3.21	3.14	2.95
Lead	ppm	ND	ND	ND	ND
Mercury	ppm	ND	ND	ND	ND

Footnotes:

[1] See Figure 1 for Sampling locations
[2] Flash Points are for surficial water samples.
[3] ND = Not Detected. See Table 5 for EPA maximum concentrations for EP Toxicity and analytical detection limits.

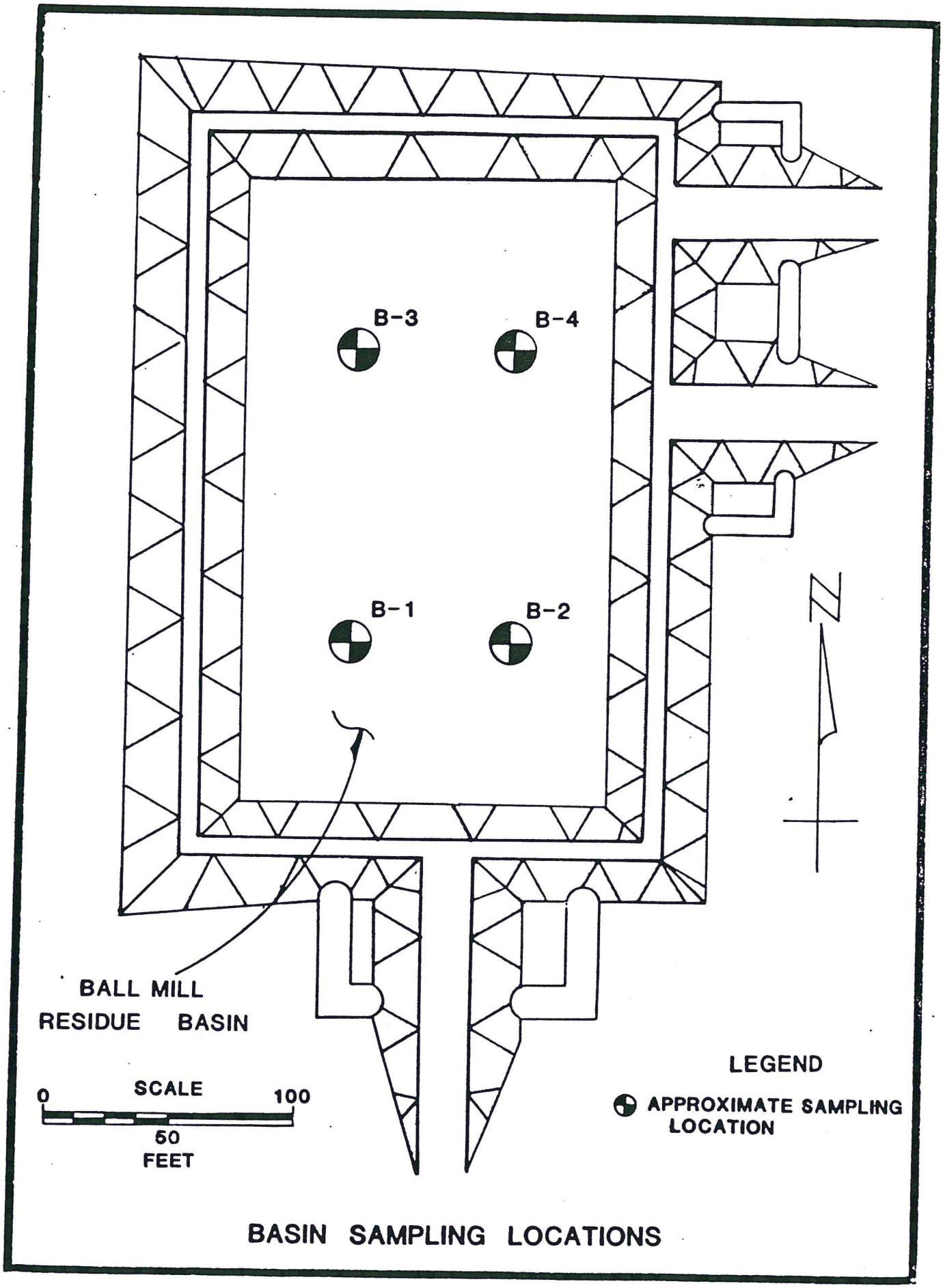
Table 5

Maximum Concentrations for Characteristics of EP Toxicity [1] and Detection limits

Parameter	Maximum Concentration (ppm)	Detection Limit (ppm)
Selenium	1.0	0.1
Silver	5.0	0.1
Arsenic	5.0	0.1
Barium	100.0	5
Cadmium	1.0	0.05
Chromium	5.0	0.2
Lead	5.0	1
Mercury	0.2	0.002

Footnote:

[1] From 40 CFR 261.24, Table 1



BASIN SAMPLING LOCATIONS

FIGURE 1

STATUS OF GROUNDWATER UNDERNEATH BALL MILL RESIDUE BASIN

I. REQUEST

Union Carbide Corporation (UCC) requests the Texas Water Commission (TWC) to review the groundwater quality data for the Ball Mill Residue Basin and to determine if further groundwater monitoring and/or corrective action is required for the closed (decontaminated) surface impoundment.

II. BACKGROUND

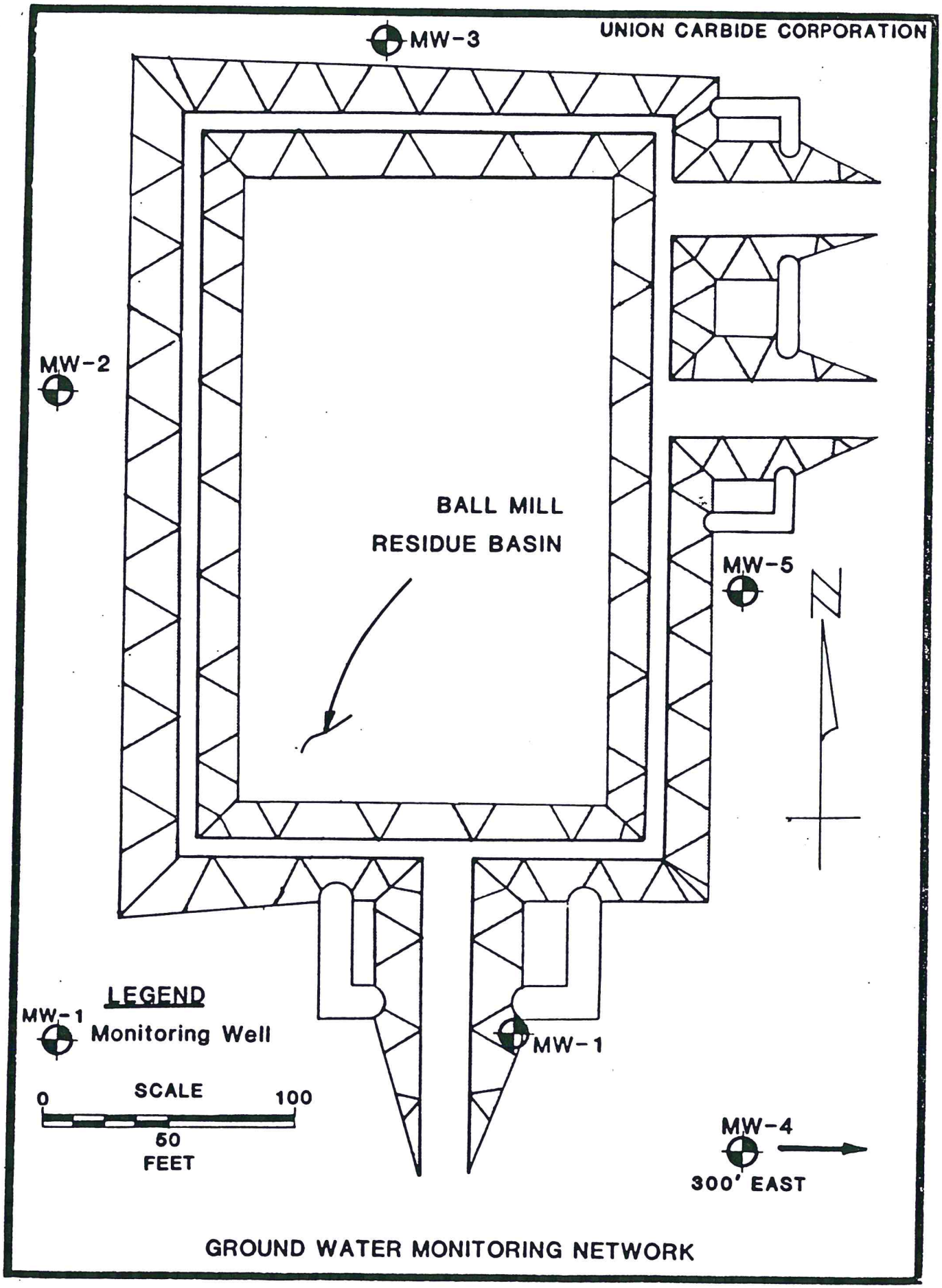
A. Local Geology

A geologic investigation of the site was conducted by NFS/National Soil Services, Inc. in 1981. The results indicate the basin to be on top of 10 to 15 feet of firm to hard clay and silty clay with occasional thin sand seams followed by 2 to 3 feet of medium dense sand and clayey silt. The next layer consisted of 3 to 6 feet of hard clay and sandy clay.

The top clay layer has a laboratory measured permeability of less than 10^{-8} cm/sec (NFS/National Soil Service) while the lower clay layer has a laboratory measured permeability of 5.2×10^{-8} cm/sec (Environmental Research and Technology).

B. Monitoring Well Network

In May 1982, NFS/National Soil Services, Inc. installed four monitoring wells (three down-gradient; one up-gradient) around the basin. Figure 1 shows the locations of the wells. Wells MW-1, MW-2 and MW-3 are the down-gradient wells and MW-4 is the up-gradient (unaffected) well. Well logs of the wells are presented in Attachment A. Note: Wells are screened to sample the sand layer between the two clay layers.



GROUND WATER MONITORING NETWORK

FIGURE 1

In September 1985, Environmental Research and Technology, Inc. installed a fifth monitoring well (MW-5) to assure that any contaminant plume leaving the basin through the sand layer would be detected. Refer to Figure 1 for well location and Attachment A for well logs.

C. Monitoring Program

Due to the low permeability of the upper clay layer, UCC requested Texas Department of Water Resources (TDWR) to waive groundwater monitoring. Instead, TDWR granted UCC a partial waiver of monitoring requirements. See Attachment B.

The waiver stated that UCC must annually measure the groundwater surface elevation and analyze water samples for the following parameters/compounds in all the monitoring wells.

Arsenic	Selenium	Chloride
Barium	Silver	Fluoride
Cadmium	Total Dissolved Solids	Nitrate
Chromium	Total Organic Carbon	Potassium
Lead	Calcium	Iron
Mercury	Sodium	Manganese
	Bicarbonate	

The waiver agreement requires UCC to report the results of the monitoring program in the annual summary reports without conducting any statistical determination of potential groundwater contamination.

D. Monitoring Results

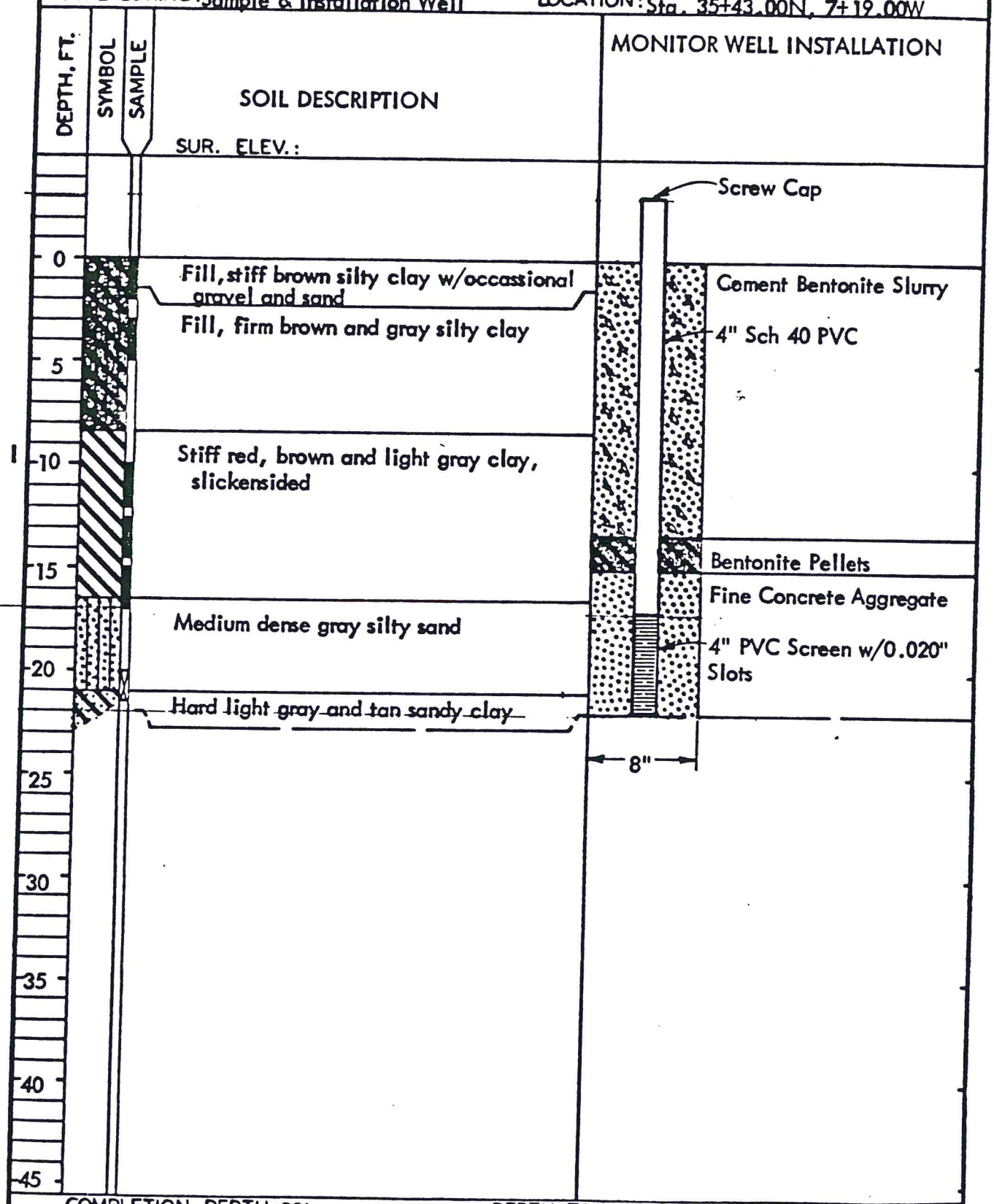
Attachment C presents the results of the groundwater monitoring program. Note: During the compiling of the data, it was noticed that well MW-1 was inadvertently labelled up-gradient while well MW-4 was labelled down-gradient in the annual summary reports. Attachment C presents the correct well designations.

Attachment A

LOG OF BORING NO. MW-1

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 35+43.00N, 7+19.00W



COMPLETION DEPTH: 22'
DATE: May 6, 1982

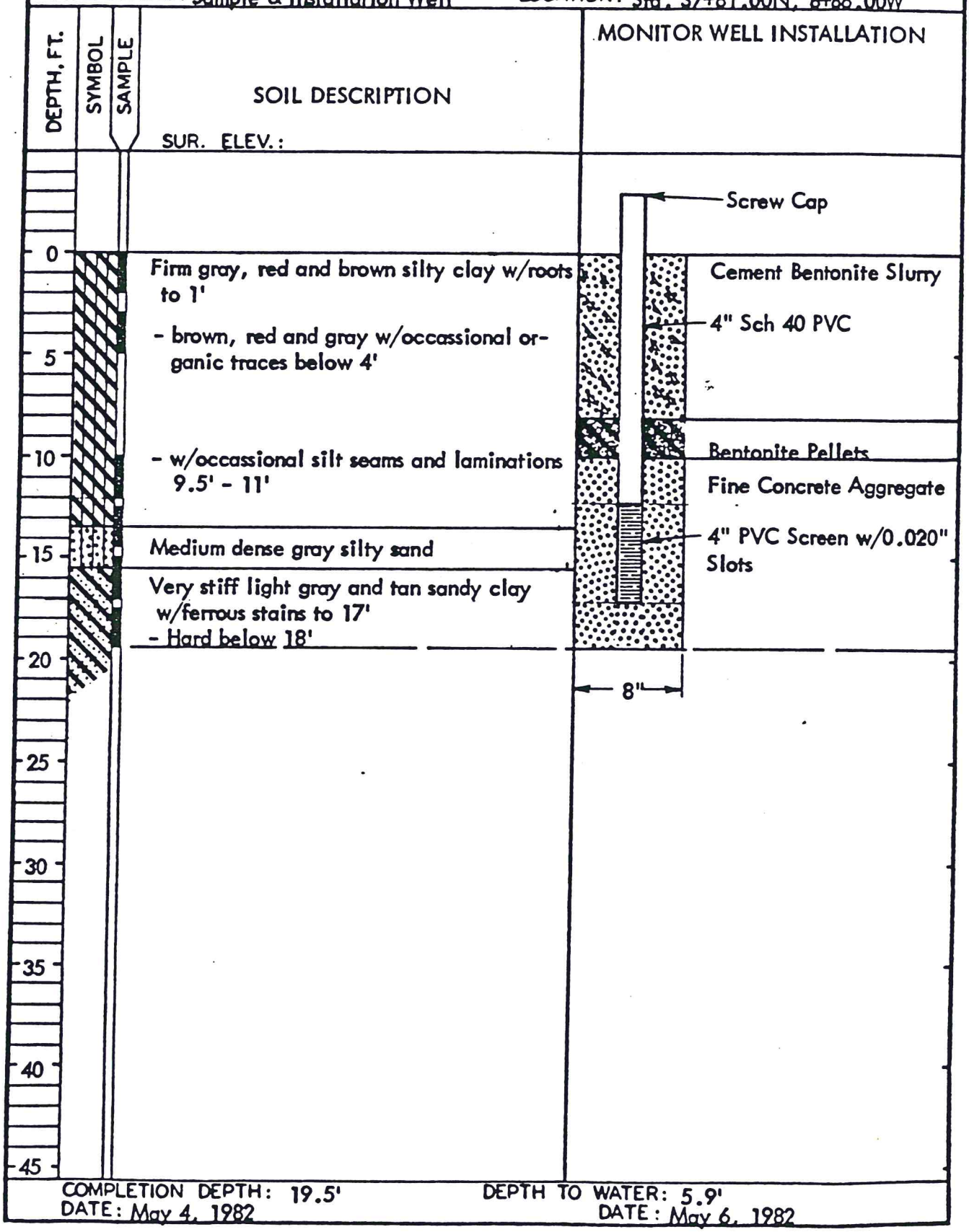
DEPTH TO WATER: Not Measured
DATE:

NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 2

LOG OF BORING NO. MW-2
MONITOR WELLS
HAZARDOUS WASTE PROCCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 37+81.00N, 8+86.00W



COMPLETION DEPTH: 19.5'
DATE: May 4, 1982

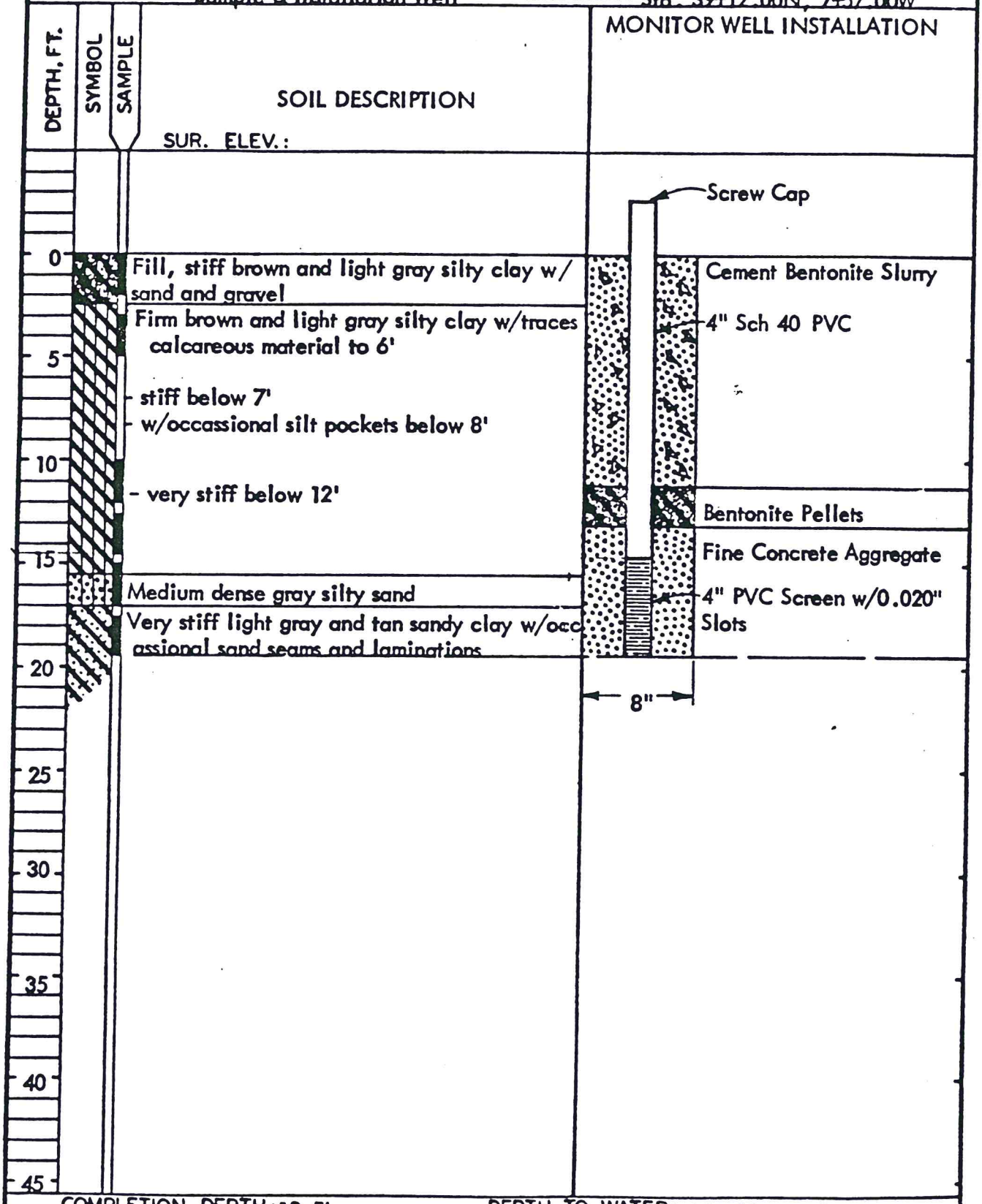
DEPTH TO WATER: 5.9'
DATE: May 6, 1982

NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 3

LOG OF BORING NO. MW-3
MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 39+12.00N, 7+57.00W



COMPLETION DEPTH: 19.5'
DATE: May 5, 1982

DEPTH TO WATER: Not Measured
DATE:

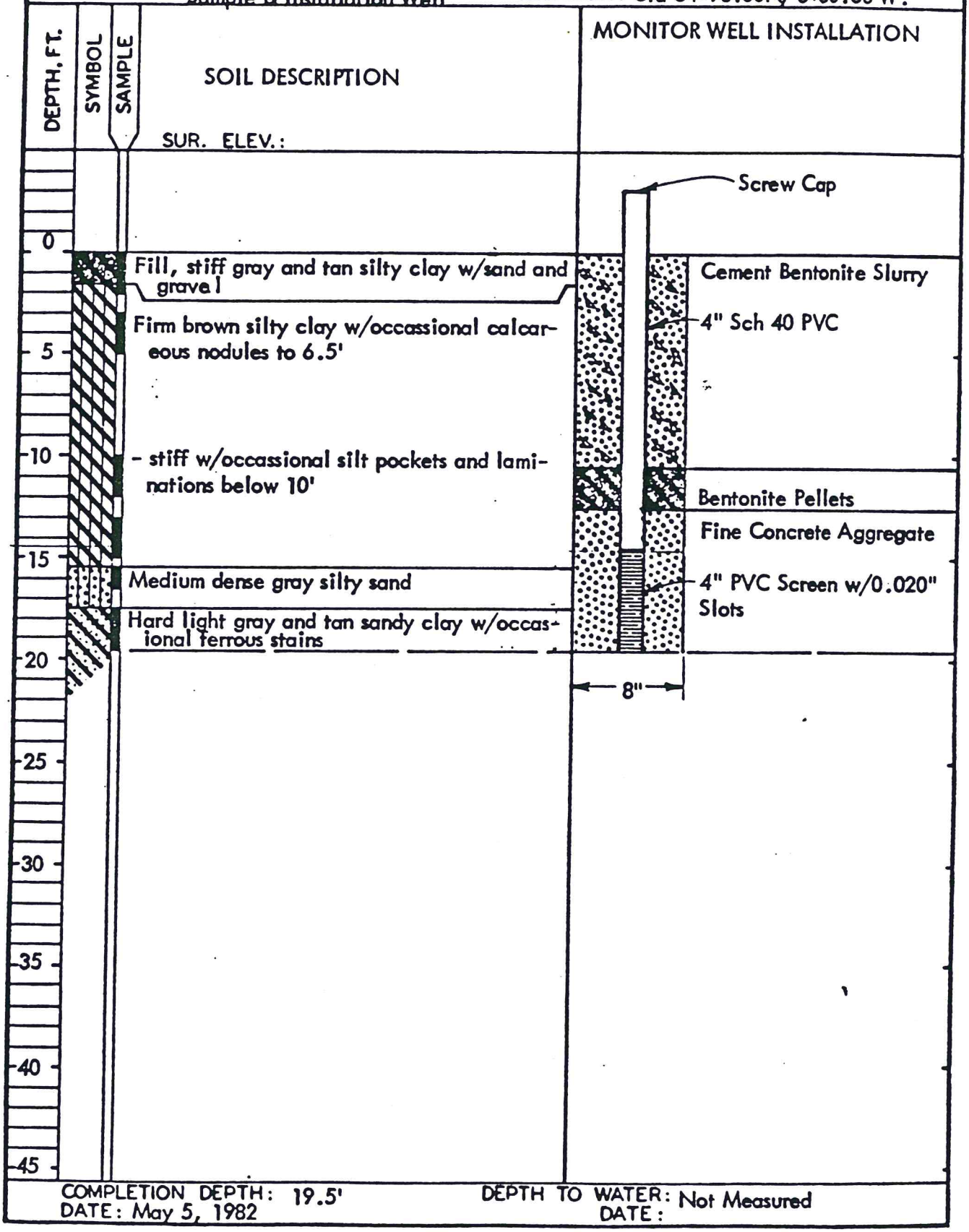
NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 4

LOG OF BORING NO. MW-4

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta 34+98.00N, 3+30.00 W.

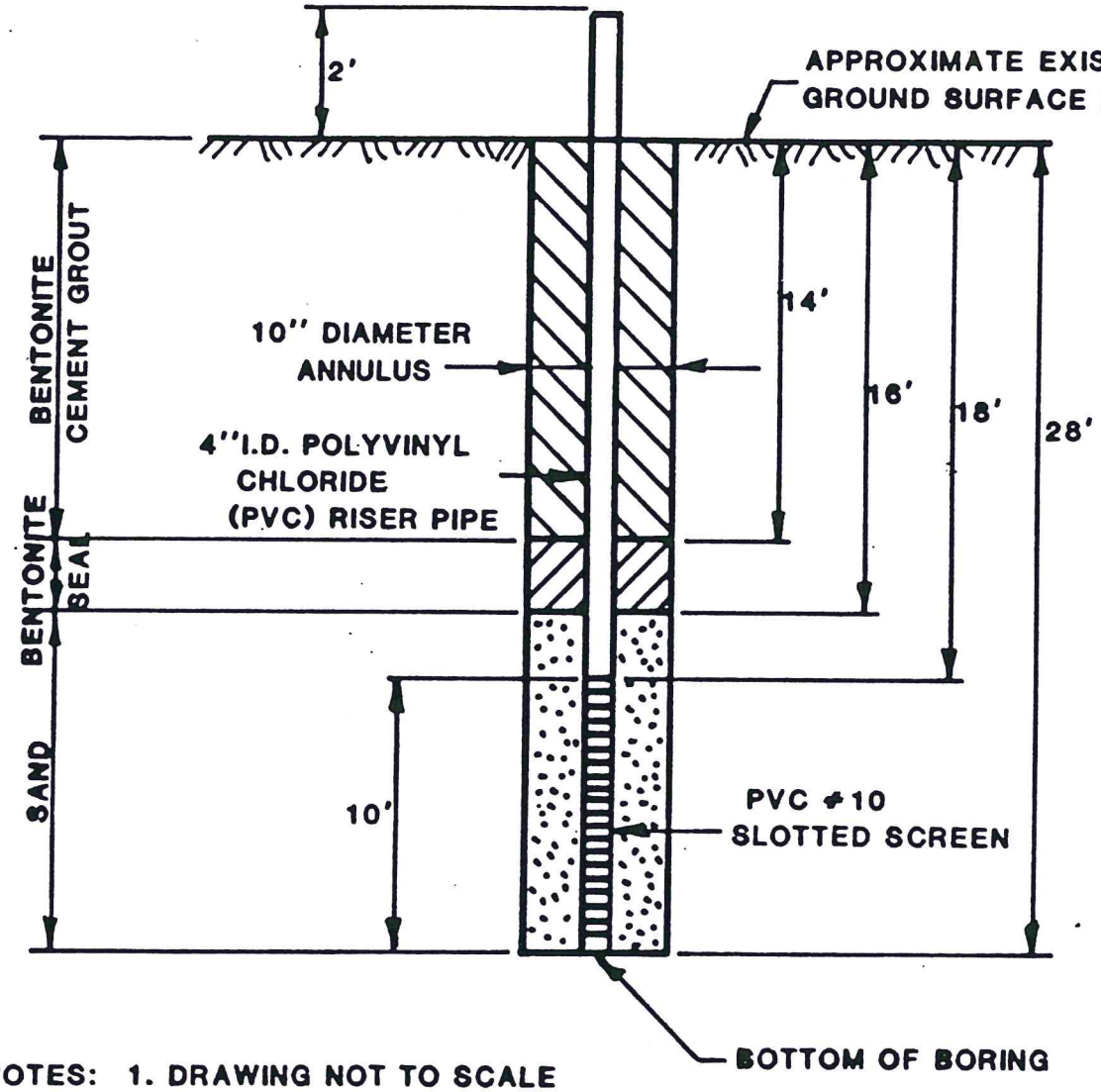


COMPLETION DEPTH: 19.5'
DATE: May 5, 1982

DEPTH TO WATER: Not Measured
DATE:

NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 5



NOTES:
1. DRAWING NOT TO SCALE
2. DEPTH DATUM IS GROUND SURFACE
3. FOR LOCATION OF WELLS SEE FIGURE 1
4. WATER LEVEL AT 12.23 FEET BELOW TOP OF CASING ON 9/23/85.

UNION CARBIDE CORPORATION

WELL INSTALLATION
WELL MW-5

Project D866-250 Site UCC BROWNSVILLE **BORING** MW-5 Sh 1 of 1

Date Started 9-20-85 Completed 9-20-85 Ground Elevation _____

Total Depth 30 feet Location BALL MILL BASIN Logged by CAMERON TELLER

Casing I.D. 4 inches Contractor SOUTHWESTERN LABORATORIES

Remarks WELL INSTALLED ON EAST SIDE OF BASIN

BORING DRILLED WITH 6" I.D. HOLLOW STEM AUGERS - NO DRILLING FLUID.

Elev. Feet	Depth Feet	Sample Type & Number	Sample Blows per 6 In.	Sample Depth Range	Sample Rec.	Graphic Log	Sample Description	Equipment Installed
	0							2' STICKUP
		J1	N.A.	0-2'			FILL - DARK BROWN CLAY W/ROOTLETS AND SHELL FRAGMENTS.	
		J2		2-4'				
	5	J3		4-6'			BROWN SILTY CLAY	
		J4		6-8'			— SOME SAND FROM 8'	
		J5		8-10'			— Fe CONCRETIONS & STAINING FROM 10', GRADUALLY SOFTER	
	10	J6	N.A.	10-12'				
		J7		12-14'				
	15	J8		14-16'			— LESS SILTY FROM 15' — STIFFER FROM 16'	
		J9		16-18'				
	20	J10	N.A.	18-20'			GRAYISH-BROWN SILTY FINE SAND, HIGH WATER CONTENT.	
		J11		23-25'				
	25	T12	N.A.	28-30'			GRAY TO YELLOW TO BROWN MOTTLED SANDY CLAY — CALCAREOUS FROM 28'	
	30						SHELBY TUBE PUSHED FOR SAMPLE →	
							Bottom of Boring at 30.0'	

1911 (1 81)

ERT
ENVIRONMENTAL RESEARCH & TECHNOLOGY INC

Attachment B

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

TEXAS WATER DEVELOPMENT BOARD
Louis A. Beecherl, Jr., Chairman
George W. McCleskey, Vice Chairman
Glen E. Roney
W. O. Bankston
Lonnie A. "Bo" Pilgrim
Louie Welch

Harvey Davis
Executive Director

TEXAS WATER COMMISSION
Lee B. M. Biggart, Chairman
Felix McDonald
John D. Stover

July 1, 1982

Mr. W. W. McManus, Plant Manager
Union Carbide Corporation
P.O. Box 3370
Brownsville, Texas 78520

Dear Mr. McManus:

RE: Solid Waste Registration No. 31108
Hazardous Waste Ground Water Monitoring
Cameron County

The Texas Department of Water Resources (TDWR) has received your letter dated May 25, 1982 which requests a partial waiver of the ground-water monitoring requirements which apply to a hazardous waste surface impoundment at the company's Brownsville facility. The Department has by previous letter dated February 23, 1982 responded to an earlier request by the company that all of the hazardous waste ground-water monitoring requirements for the facility be waived. The Department responded that the facility does not pose a sufficiently low potential for the migration of hazardous waste constituents to warrant a full waiver of the ground-water monitoring requirements. The company was instructed to install a monitoring system for the surface impoundment within 90 days in conformance with Texas Administrative Code (TAC) Sections 335.191-.195 (TDWR Rules 156.22.12.001-.005). The company notified the Department by letter dated May 17, 1982 of the installation of four wells which constitute the physical components of a ground-water monitoring system capable of complying with the cited rules. During a technical conference in Austin on April 16, 1982, TDWR staff members agreed that due to the favorable hydrogeologic environment it would be appropriate for the company to request a partial waiver which would allow less frequent ground-water monitoring for a reduced list of parameters than that specified in the solid waste rules.

In accordance with TAC Sections 335.191-.195 (TDWR Rules 156.22.12.001-.005), the TDWR approves the ground-water monitoring plan described in this letter. This action constitutes a partial waiver of the hazardous waste ground-water monitoring requirements which would otherwise apply to the surface impoundment. The ground-water monitoring system must comply with TAC Section 335.192 (TDWR Rule 156.22.12.002) which establishes construction and performance standards for the monitoring system. An upgradient (unaffected) well (i.e., MW-4) and three downgradient wells (i.e., MW-1, MW-2, and MW-3) shall be sampled on an annual basis. Ground-water samples withdrawn shall be analyzed for: arsenic, barium, cadmium, chromium, lead,

mercury, selenium, silver, total dissolved solids, calcium, sodium, bicarbonate, chloride, fluoride, nitrate, potassium, iron, magnesium, sulfate, and total organic carbon. Elevation of the ground-water surface at each monitoring well must also be determined each time a sample is obtained. The following sections of the Department's solid waste rules apply to the ground-water monitoring system to be implemented by the company: TAC Section 335.191 (TDWR Rule 156.22.12.001); TAC Section 335.193(a) [TDWR Rule 156.22.12.003(a)]; TAC Section 335.194(a) [TDWR Rule 156.22.12.004(a)]; and TAC Section 335.194(f) [TDWR Rule 156.22.12.004(f)]. Records of the analyses and ground-water surface elevations are to be maintained throughout the active life of the facility and for the post-closure care period as well. Results of the analyses and ground-water level measurements are to be submitted annually by January 21 as part of the annual report required by TAC Section 335.175(b) [TDWR Rule 156.22.11.005(b)].

If we may be of further assistance in this matter or if you have any questions regarding this letter, please contact the Solid Waste Section at AC 512/475-2041.

Sincerely,

Harvey Davis
Executive Director

cc: Solid Waste and Spill Response Section, Enf. & Field Oper. Division
TDWR District 11 Office - Weslaco

Attachment C

NOTE

Union Carbide has conducted the annual groundwater sampling program for 1985. The samples are currently being analyzed by Pan American Laboratory of Brownsville. As soon as the results are available, UCC will transmit to the Texas Water Commission a revised version of this attachment.

Contamination Indicators

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
pH					
1982	6.98	6.60	7.20	6.46	-
1983	7.19	6.68	7.26	6.44	-
1984	7.22	6.84	7.25	6.55	-
1985					
TOC (ppm)					
1982	280	63	147	50	-
1983	251	54	67	7	-
1984	275	34	66	0.4	-
1985					

Groundwater Elevations

MSL (ft)					
1982	2.44	2.00	2.18	1.98	-
1983	3.22	2.28	2.41	2.41	-
1984	4.1	2.73	2.9	3.15	-
1985					

Drinking Water Parameters

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
Arsenic (ppm)					
1982	0.043	0.027	0.035	0.082	-
1983	0.045	0.032	0.027	0.013	-
1984	ND	ND	ND	ND	-
1985					
Barium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985					
Cadmium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	0.037	ND	0.047	-
1984	ND	ND	ND	ND	-
1985					
Chromium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985					
Lead (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	0.47	ND	0.60	-
1984	ND	ND	ND	ND	-
1985					

ND = Not Detected

Drinking Water Parameters (Cont.)

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
Mercury (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985					
Nitrate (ppm as N)					
1982	0.15	0.23	0.14	0.21	-
1983	0.42	0.50	0.77	0.63	-
1984	0.42	0.55	0.60	0.45	-
1985					
Fluoride (ppm)					
1982	1.32	0.97	1.48	0.89	-
1983	3.34	2.74	3.45	2.41	-
1984	5.6	4.3	5.0	2.9	-
1985					
Selenium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985					
Silver (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985					

ND = Not Detected

Groundwater Quality Parameters

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
TDS (ppm)					
1982	10,700	31,700	9,300	49,000	-
1983	9,320	38,300	9,280	69,600	-
1984	21,700	7,680	17,900	6,400	-
1985					
Calcium (ppm)					
1982	264	1,190	184	2,360	-
1983	155	1,010	175	1,880	-
1984	-	-	-	-	-
1985					
Sodium (ppm)					
1982	4,615	7,910	4,140	8,030	-
1983	2,000	7,480	2,130	8,160	-
1984	3,700	9,360	4,140	10,100	-
1985					
Bicarbonate (ppm)					
1982	1,500	670	1,270	366	-
1983	1,560	704	1,340	400	-
1984	1,880	695	1,354	427	-
1985					
Chloride (ppm)					
1982	3,660	15,000	2,150	19,200	-
1983	2,950	14,500	2,070	19,400	-
1984	1,970	12,800	2,300	18,600	-
1985					

Groundwater Quality Parameters (Cont.)

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
Potassium (ppm)					
1982	3.60	5.70	2.24	7.94	-
1983	27.71	46.65	19.00	75.14	-
1984	80	108	73	149	-
1985					
Iron (ppm)					
1982	3.13	2.71	1.13	3.43	-
1983	2.69	1.98	1.08	2.90	-
1984	2.05	2.12	1.11	2.76	-
1985					
Manganese (ppm)					
1982	1.37	4.01	0.96	5.91	-
1983	0.91	3.26	0.68	5.61	-
1984	0.55	2.93	0.60	6.68	-
1985					
Sulfate (ppm)					
1982	1,580	2,830	2,820	1,940	-
1983	1,270	2,860	2,660	1,900	-
1984	930	2,950	2,580	1,950	-
1985					
Magnesium (ppm)					
1982	308	1,440	158	1,730	-
1983	160	1,090	164	1,920	-
1984	92	950	144	1,550	-
1985					

ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.
12012 WICKCHESTER, SUITE 200, HOUSTON, TEXAS, 77079, (713) 558-8500

ERT Ref No. D866-190/210

September 25, 1985

Mr. Alan Booth
Union Carbide Corporation
P. O. Box 8361
Building 2000, Room 3409
South Charleston, W.Va 25303

Letter of Certification
Tanks 3326, 5211 and Incinerator
Union Carbide Corporation
Brownsville, Texas

Dear Mr. Booth:

This letter is provided for your use in submission of the closure plans for the Brownsville plant incinerator and Tanks 3326 and 5211 to the appropriate regulatory agencies.

I hereby certify that the closure plans for the subject facilities are consistant with good engineering practice and, to the best of my knowledge, comply with current RCRA closure requirements applicable to such facilities.

Sincerely,

John R. Mitchell

John R. Mitchell, P.E.
P.E. No. 27382

JRM/ars

INCINERATOR
CLOSURE PLAN

Facility: Union Carbide Brownsville Plant

Address: P. O. Box 3370
Brownsville, Texas 78520

TDWR Registration No.: 31108

Prepared by: ERT, Inc.
12012 Wickchester, Suite 200
Houston, Texas 77079

Facility Contact: Mr. Edward Robertson
Solvents and Coating Divison

REGULATORY REQUIREMENTS

This closure plan complies with RCRA regulations as given in 40 CFR, Part 264, Subpart O.

FACILITY DESCRIPTION

A waste incinerator was placed into service at the Brownsville plant in 1964 to dispose of liquid wastes consisting of volatile organic acids, mixed esters, mixed ketones and water. The liquid waste typically contained acetic, formic, propionic and butyric acid (EPA hazardous waste numbers D001, D002, U123) generated from the acetic acid production process. The liquid also contained elevated concentrations of chromium (EPA hazardous waste number D007). Under 40 CFR, 261.3 (c) (2) (i), the residue produced by incineration of the waste acid mixture is considered a hazardous material.

The incinerator was fed by surface storage tanks numbers 5211 and 3326 and has a design capacity to incinerate an average of 5,000 pounds per hour and a maximum of 20,000 pounds per hour of liquid wastes. A 12-foot diameter flameless dispersion stack operated with an exit temperature of 1500°F. Supplemental heat for combustion was supplied by a natural gas burner due to potential changes in the heating value of the residues. The waste residues were fed to the incinerator by a circular manifold and six mechanical atomizing liquid nozzles. The system also incorporated a full flame safeguard and high stack temperature shutdown.

The incinerator was normally used on a periodic basis when the energy-producing boilers, which used waste liquids as fuel, were out of service for an extended period or when it was necessary to dispose of surplus quantities of waste liquids.

CLOSURE PROCEDURE

To determine the necessity for decontamination and the characteristics of any wastes present, limited sampling will be conducted. One surficial soil sample will be collected a sufficient distance from the incinerator to provide background concentration values. Three surficial soil

samples from around the incinerator will be collected and analyzed to determine if contamination of surficial soil occurred during operation of the incinerator. Additionally, a sample of any residue present in the incinerator stack will be collected and analyzed to determine if such residues are hazardous. Samples will be analyzed for pH, TOC and the eight EP Toxicity metals.

If residues present in the incinerator exhibit hazardous characteristics according to 40 CFR 261, Subpart C and D, this unit will be decontaminated by first removing any free residues and then cleaning the interior using a steam or power spray method. Piping which carried waste materials to the incinerator will be purged using steam. Wash water from this process will be collected inside the incinerator and subsequently removed using a vacuum truck for off-site disposal. Following the cleaning procedure, all cleaning equipment will be properly decontaminated. Wash water from equipment decontamination will also be collected and removed for off-site disposal. If analysis of soils indicates contamination, surficial soils (ie; upper six inches) in the immediate vicinity of the incinerator will be excavated for off-site disposal. The soil will be deemed contaminated should analyses indicate Metals concentrations greater than those in 40 CFR 261.24, Table 1, a pH value more than 1 unit from background or values of TOC outside a 20% range from the estimated background. Following exca- vation, additional soil samples will be collected and analyzed to deter- mine if additional excavation and removal is necessary.

CLOSURE SCHEDULE

The closure process will commence within 30 days of closure plan approval. We currently anticipate that the closure program will require approximately 60 days to execute and will be completed in 1986. Table 1 presents the key elements to the closure process and the anticipated duration.

Table 1

Incinerator Closure Schedule

By Day	Activity
0	Approval of Closure Plan by Texas Department of Water Resouces (TDWR).
32	Collect soil samples around incinerator and residue sample from within incinerator.
44	Receive analytical results and begin decontamination procedures.
51	Decontamination completed; begin soil excavation if necessary.
58	Soil excavation completed.
59	Incinerator inspection and certification by independent registered engineer and owner.
60	Submit certified closure to TDWR.

CERTIFICATION

In addition to the appropraite Union Carbide personnel, an independent registered professional engineer will inspect the incinerator and examine the analytical results from the soil sampling to ensure compliance with the closure plan.

PERSONNEL AND ENVIRONMENTAL PROTECTION

To ensure adequate worker and environmental protection, the plant Spill Prevention Control and Countermeasure Plan procedures will be strictly adhered to. This plan ensures that the requirements of equipment preparation are defined and that precautionary measures are taken to protect the safety of personnel and the environment.

TANK 3326
CLOSURE PLAN

Facility: Union Carbide Brownsville Plant

Address: P. O. Box 3370
Brownsville, Texas 78520

TDWR Registration No.: 31108

Prepared by: ERT, Inc.
12012 Wickchester, Suite 200
Houston, Texas 77079

Facility Contact: Mr. Edward Robertson
Solvents and Coatings Division

REGULATORY REQUIREMENTS

This closure plan complies with RCRA regulations for closure as given in 40 CFR Part 264, Subpart J.

FACILITY DESCRIPTION

Tank 3326 is 44 feet in diameter, 24 feet high with a holding capacity of approximately 273,000 gallons. The tank was put into operation in 1976 for added storage capacity of waste liquid containing acetic, formic, propionic and butyric acid (EPA hazardous waste number D001, D002 and U123) generated from the acetic acid production process. The liquid also contained elevated concentrations of chromuim (EPA hazardous waste number D007). The tank was tied to the process line feeding the plant waste incinerator. Recent visual inspection revealed approximately one foot (57 cubic yards) of sludge in the bottom of the tank.

The tank area is enclosed by an earth dike approximately three feet high. Records indicate that the tank rests on a cement slab while the remaining area within the dike is natural ground.

CLOSURE PROCEDURES

To determine the characteristics of the sludge within the tank and the presence of potentially contaminated surficial soil, limited sampling will be conducted. Four soil samples from depths of 0" to 6" within the dike area will be collected and analyzed for pH, TOC and EP Toxicity metals. One surficial soil sample from a nearby clean area will be collected and analyzed to determine background concentrations for these parameters. The soil will be deemed contaminated if results of analyses indicate EP Toxicity metals values greater than those in 40 CFR 261.24, Table 1, a pH value more than 1 unit from background or values of TOC outside of a 20% range from the background value. One sample of sludge from within the tank will be collected and analyzed to characterize the sludge for disposal. Analyses will include determination of pH, TOC, EP Toxicity metals and flash point.

Water will be added to the tank sludge to create a slurry mixture which will then be pumped out of the tank by vacuum trucks for proper off-site disposal. The interior of the tank will then be decontaminated using a high pressure jet spray. Piping associated with the tank will be purged with steam. The wash water generated by this process will be collected in the bottom of the tank and removed by vacuum trucks for subsequent off-site disposal. It may be necessary to repeat the wash cycle several times to ensure proper cleaning.

If soil samples are found to be contaminated, the surficial soils (to a depth of 6") will be excavated for off-site disposal. Following excavation, additional soil samples will be collected and analyzed for the indicator parameters to determine if additional excavation and removal is necessary. Upon completion of closure, all cleaning equipment including vacuum trucks and contractor vehicles will be properly decontaminated. The wash water will be collected and removed for off-site disposal.

CLOSURE SCHEDULE

The closure program will be initiated within 30 days of receiving TDWR approval of the closure plan and will require approximately 60 days to execute. Closure is expected to be completed in 1986. Table 1 presents the key elements and the anticipated duration to complete closure of Tank 3326.

Table 1

Tank 3326 Closure Schedule

By Day	Activity
0	Approval of Closure Plan by Texas Department of Water Resouces (TDWR).
32	Collect soil samples around tanks.
44	Receive analytical results and begin decontamination procedures.
51	Decontamination completed; begin soil excavation if necessary.
58	Soil excavation completed.
59	Tank inspection and certification by independent registered engineer and owner.
60	Submit certified closure to TDWR.

CERTIFICATION

In addition to the appropriate UCC personnel, an independent registered professional engineer will inspect the tanks and examine the analytical results from the soil sampling to ensure compliance with the closure plan.

PERSONNEL AND ENVIRONMENTAL PROTECTION

To ensure adequate worker and environmental protection, the plant Spill Prevention Control and Countermeasure Plan procedures will be strictly adhered to. This plan ensures that the requirements of equipment preparation are defined and that precautionary measures are taken to protect the safety of personnel and the environment.

TANK 5211
CLOSURE PLAN

Facility: Union Carbide Brownsville Plant

Address: P. O. Box 3370
Houston, Texas 78520

TDWR Registration No.: 31108

Prepared by: ERT, Inc.
12012 Wickchester, Suite 200
Houston, Texas 77079

Facility Contact: Mr. Edward Robertson
Solvents and Coatings Division

REGULATORY REQUIREMENTS

This closure plan complies with RCRA regulations for closure as given in 40 CFR Part 264, Subpart J.

FACILITY DESCRIPTION

Storage Tank No. 5211 is 11 feet in diameter and approximately 20 feet high with a holding capacity of approximately 14,400 gallons. The tank area is enclosed by a 6-inch concrete containment dike and the tank rests on concrete support pedestals over the natural ground surface. Tank 5211 acted as a storage tank for formic acid and miscellaneous flammable liquids. The tank is tied to the process line feeding the plant waste incinerator. The tank was cleaned according to standard UCC tank cleanup procedures when the plant was shut down in March 1983. Briefly, these procedures consisted of checking all transfer lines to the tank to ensure that tank contents and flushing liquid could be pumped to the proper location. The valving was then set up and the tranfer was performed and logged. The flushing liquid was then added and circulated in the tank. Flushing was repeated as necessary, and the flushing liquid was routed to its final destination. Tank levels were closely monitored throughout the process, and tanks were air vented following cleaning. Preliminary visual inspection indicates Tank 5211 has been adequately cleaned.

CLOSURE PROCEDURES

Storage Tank No. 5211 will be inspected to determine if additional cleaning is required. At the start of the cleaning process, any remaining residues will be removed from the tank for subsequent off-site disposal. The tank will then be decontaminated using a high pressure jet wash to clean the interior of the tank. Piping associated with the tank will be purged using steam. The wastewater generated by this process will be collected in the tank and will be removed using a vacuum truck for proper off-site disposal.

To determine if surficial soils have been contaminated by occassional surface spills, a surficial soil sampling program will be conducted within the diked area. Surficial soil samples will be collected at three locations adjacent to the tank from 0" to 6" and analyzed for EP Toxicity metals, pH, and TOC. One surficial soil sample from a nearby clean area will be collected and analyzed to determine background concentrations for these parameters. The soil will be deemed contaminated if it shows concentrations of metals greater than that given in 40 CFR 261.24, Table 1, a pH value of more than 1 unit from background or values of TOC outside a 20% range from the background. Any contaminated soil within the diked area will be excavated and removed for proper off-site disposal. Following excavation, additional soil samples will be collected and analyzed for the indicator parameters to determine if additional excavation and removal is necessary. Upon completion of closure, all cleaning equipment including vacuum trucks will be properly decontaminated. The wash water will be collected and removed for off-site disposal.

CLOSURE SCHEDULE

The closure program will be initiated within 30 days of receiving TDWR approval of the closure plan and will require approximately 60 days to execute, with the closure being completed in 1986. Table 1 presents the key elements and the anticipated duration to complete closure of tank 5211.

CERTIFICATION

In addition to the appropriate UCC personnel, an independent registered professional engineer will inspect the tank and examine the analytical results from the soil sampling to insure compliance with the closure plan.

Table 1

Tank 5211 Closure Schedule

By Day	Activity
0	Approval of Closure Plan by Texas Department of Water Resouces (TDWR).
32	Collect soil samples around tanks.
44	Receive analytical results and begin decontamination procedures.
51	Decontamination completed; begin soil excavation if necessary.
58	Soil excavation completed.
59	Incinerator inspection and certification by independent registered engineer and owner.
60	Submit certified closure to TDWR.

PERSONNEL AND ENVIRONMENTAL PROTECTION

To ensure adequate worker and environmental protection, the plant Spill Prevention Control and Countermeasure Plan procedures will be strictly adhered to. This plan ensures that the requirements of equipment preparation are defined and that precautionary measures are taken to protect the safety of personnel and the environment.

ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.
12012 WICKCHESTER, SUITE 200, HOUSTON, TEXAS, 77079, (713) 558-8500

ERT Ref No. D866-240

September 27, 1985

Mr. Alan C. Booth
Union Carbide Corporation
P. O. Box 8361
Building 2000, Room 3409
South Charleston, W. VA 25303

Letter of Certification
Closure Cost Estimate
Union Carbide Corporation
Brownsville, Texas

Dear Mr. Booth:

This letter is provided for your use in submission of the closure plans for the Brownsville plant incinerator and Tanks 3326 and 5211 to the appropriate regulatory agencies.

I certify that closure costs for the subject facilities were prepared in accordance with recognized estimating procedures designed to produce an order of magnitude estimate as defined by the American Association of Cost Engineers.

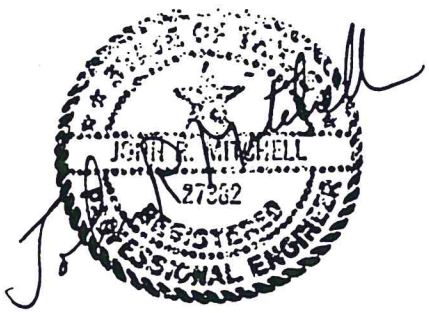
The estimate is based on information supplied by Union Carbide Corporation and upon the closure plans developed for submission to the regulatory agencies. Deviation from these plans or information would directly affect the quality of the estimate.

Sincerely,

John R. Mitchell

John R. Mitchell, P.E.
P.E. No. 27382

JRM/ars



ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.
12012 WICKCHESTER, SUITE 200, HOUSTON, TEXAS, 77079, (713) 558-8500

September 27, 1985

Mr. Alan Booth
Union Carbide Corporation
P.O. Box 8361
Building 2000, Room 3409
South Charleston, W. Va. 25303

CLOSURE COST ESTIMATE
Tanks 5211, 3326 and Incinerator
UNION CARBIDE CORPORATION
Brownsville, Texas

Dear Mr. Booth:

The attached closure costs (Table 1) for the incinerator, Tank 3326, and Tank 5211 at Union Carbide Corporation's Brownsville Plant are preliminary and are based upon assumptions about the following quantities:

- Volume of contaminated soil at each facility;
- Volume of contaminated wash water generated at each facility;
- Volume of residue in the incinerator; and
- Number of soil samples at each facility necessary to identify the extent of surficial soil contamination.

Unit costs are from Means Estimating Guide and discussions with disposal contractors, and are based upon the following assumptions:

- Disposal of contaminated soil in a hazardous landfill;
- Disposal of sludge and residue in a hazardous landfill after solidification with kiln dust; and
- Disposal of wash water in an injection well.

Disposal prices are based upon general discussions with the following contractors:

- Chemical Plant Services, Pasadena, Texas;
- Chemical Waste Management, Corpus Christi, Texas; and
- Texas Ecologist, Robstown, Texas.

Please feel free to contact me or John Mitchell at (713)558-8500 if you have any questions.

Sincerely,

Thomas M Johnson

Thomas M. Johnson
Sr. Hydrogeologist
TMJ/ckp

Table 1

Closure Cost Estimate

Tanks 5211, 3326, and Incinerator

Item	Quantity	Units	Unit Cost	Cost
Incinerator				
Background Soil Samples	2	each	$194.00	$388.00
Soil Samples	3	each	$194.00	$582.00
Post-excavation Samples	3	each	$194.00	$582.00
Stack Residue Samples	1	each	$194.00	$194.00
Remove Residue & Haul	8	Crew hrs	$1625.00	$13000.00
Solidify Residue	10	Cu Yds	$163.00	$1630.00
Dispose of Residue	40	Drums	$45.00	$1800.00
Hydroblast Incinerator Remove, & Haul Water	8	Crew hrs	$1625.00	$13000.00
Dispose of Water	5000	Gals	$ .20	$1000.00
Soil Excavation	570	Cu Yds	$ 1.10	$627.00
Haul Soil	570	Cu Yds	$ 15.00	$8550.00
Dispose of Soil	570	Cu Yds	$ 80.00	$45600.00
Inspect and Certify	1	L.S.	$4612.00	$4612.00
		Incinerator Subtotal		$91565.00
Tank 3326				
Background Soil Samples	2	each	$194.00	$388.00
Soil Samples	4	each	$194.00	$776.00
Post-excavation Samples	4	each	$194.00	$776.00
Sludge Samples	1	each	$194.00	$194.00
Remove Sludge & Haul	8	Crew hrs	$1625.00	$13000.00
Solidify Sludge	142	Cu Yds	$163.00	$23146.00
Dispose of Sludge	420	Drums	$45.00	$18900.00
Hydroblast Tank & Haul Water	16	Crew hrs	$1625.00	$26000.00
Dispose of Water	10000	Gals	$ .20	$2000.00
Steam Purge Lines	8	Crew hrs	$1625.00	$13000.00
Soil Excavation	420	Cu Yds	$ 1.10	$462.00
Haul Soil	420	Cu Yds	$ 15.00	$6300.00
Dispose of Soil	420	Cu Yds	$ 80.00	$33600.00
Inspect and Certify	1	L.S.	$4612.00	$4612.00
		Tank 3326 Subtotal		$143154.00

Table 1 (continued)

Closure Cost Estimate

Tanks 5211, 3326, and Incinerator

Item	Quantity	Units	Unit Cost	Cost
Tank 5211				
Background Soil Samples	2	each	$194.00	$388.00
Soil Samples	3	each	$194.00	$582.00
Post-excavation Samples	3	each	$194.00	$582.00
Steam Purge Lines	8	Crew hrs	$1625.00	$13000.00
Hydroblast Tank & Haul Water	16	Crew hrs	$1625.00	$26000.00
Dispose of Water	5000	Gals	$ .20	$1000.00
Soil Excavation	50	Cu Yds	$ 1.10	$ 55.00
Haul Soil	50	Cu Yds	$ 15.00	$ 750.00
Dispose of Soil	50	Cu Yds	$ 80.00	$ 4000.00
Inspect and Certify	1	L.S.	$4612.00	$4612.00
		Tank 5211 Subtotal		$50969.00
			Total	$285688.00
		25% Contigencies		$ 71500.00
		Grand Total		$357188.00

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD, DANBURY, CT 06817
Corporate Health, Safety and Environmental Affairs Department

October 10, 1985

Executive Director
Texas Water Commission
P.O. Box 13087, Capitol Station
Austin, TX 78711

Dear Sir:

Enclosed are Financial Assurance Documents which represent revised closure and post-closure estimates and the financial test to support these estimates. Union Carbide Corporation is submitting these on behalf of the facilities represented in the documents. We found it necessary to resubmit these documents for the entire corporation due to some changes in the cost estimates which will be or have been reflected in the Part "B" RCRA Permit applications for those facilities which have land disposal facilities.

If you have any questions, please advise the undersigned at (203)794-5250.

Very truly yours,

H. M. Parker

Hampton M. Parker, PhD
Assistant Corporate Director
Environmental Affairs

0357F/sg
Attachments

UNION CARBIDE CORPORATION
39 OLD RIDGEBURY ROAD
DANBURY, CT 06817-0001

J. CLAYTON STEPHENSON
EXECUTIVE VICE PRESIDENT

October 10, 1985

Executive Director
Texas Water Commission
P.O. Box 13087, Capitol Station
Austin, TX 78711

Gentlemen:

I am the Chief Financial Officer of Union Carbide Corporation, Old Ridgebury Road, Danbury, Connecticut. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in Subpart H of 40 CFR Parts 264 and 265.

1. This firm is the owner or operator of the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility:

   NONE

2. This firm guarantees, through the corporate guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure or post-closure care of the following facilities owned or operated by subsidiaries of this firm. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility:

Name	- Union Carbide Agricultural Products Company, Inc.
Address	- Woodbine, Georgia
EPA #	- GAD030035356
Closure	- $ 532,921
Post-Closure	- $2,750,499

Name	-Union Carbide Agricultural Products Company, Inc.
Address	- Institute, W.V.
EPA #	- WVD005005509
Closure	- $ 999,440
Post-Closure	- $4,264,000
Name	- Union Carbide Caribe, Inc.
Address	- Ponce, Puerto Rico
EPA #	- PRD980594618 PRD980594857 PRD980594733
Closure	- $3,137,680
Post-Closure	- $3,728,400
Name	- Union Carbide Films Packaging, Inc.
Address	- Barceloneta, Puerto Rico
EPA #	- PRD090386897
Closure	- $ 6,656
Post-Closure	- 0
Name	- Soilserv, Inc.
Address	- Salinas, California
EPA #	- CAD009165325
Closure	- $ 17,732
Post-Closure	- 0
Name	- Soilserv, Inc.
Address	- Hollister, California
EPA #	- CAD000626499
Closure	- $ 19,001
Post-Closure	- $ 0
Name	- Soilserv, Inc.
Address	- King City, California
EPA #	- CAD094974078
Closure	- $ 24,076
Post-Closure	- 0

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 or 265, this firm as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility:

Name	- Union Carbide Corporation - Silicones & Urethane Intermediates
Address	- So. Charleston, W.V.
EPA #	- WVD005005483 WVD980554828 WVD980554885
Closure	- $4,331,000
Post Closure	- $2,843,000

Name	- Union Carbide Corporation Silicones & Urethane Intermediates
Address	- Sistersville, W.V.
EPA #	- WVD004325353
Closure	- $1,984,000
Post Closure	- $1,711,000

Name	- Union Carbide Corporation Silicones & Urethane Intermediates
Address	- Nitro, W.V.
EPA #	- WVD000739722
Closure	- $ 87,000
Post Closure	- $ 624,000

Name	- Union Carbide Corporation Engineering & Technology Services
Address	- So. Charleston, W.V.
EPA #	- WVD060682291
Closure	-$ 34,175
Post-Closure	- 0

Name	- Union Carbide Corporation Linde Division
Address	- Tonawanda, N.Y.
EPA #	- NYD002123792
Closure	- $ 104,000
Post-Closure	- 0

Name	- Union Carbide Corporation Carbon Products Division
Address	- Niagara Falls, N.Y.
EPA #	- NYD002106920
Closure	- $ 29,900
Post-Closure	- 0

Name	- Union Carbide Corporation Films Packaging Division
Address	- Kentland, Indiana
EPA #	- IND000708545
Closure	- $ 54,500
Post-Closure	- 0
Name	- Union Carbide Corporation Carbon Products Division
Address	- Fostoria, Ohio
EPA #	- OHD004167219
Closure	- $ 31,200
Post Closure	- 0
Name	- Union Carbide Corporation Carbon Products Division
Address	- Lakewood, Ohio
EPA #	- OHD004167383
Closure	- $ 55,801
Post-Closure	- 0
Name	- Union Carbide Corporation Electrode Systems Division
Address	- Parma, Ohio
EPA #	- OHD003926748
Closure	- $ 19,000
Post-Closure	- 0
Name	- Union Carbide Corporation Specialty Polymers & Composites Division
Address	- Marietta, Ohio
EPA #	- OHD077479467
Closure	- $1,715,000
Post-Closure	- 0
Name	- Union Carbide Corporation Films Packaging Division
Address	- Centerville, Iowa
EPA #	- IAD041580721
Closure	- $ 42,600
Post-Closure	- 0

Name	- Union Carbide Corporation Films Packaging Division
Address	- Osceola, Arkansas
EPA #	- ARD078582301
Closure	- $ 5,200
Post-Closure	- 0
Name	- Union Carbide Corporation Films Packaging Division
Address	- Bedford Park, Illinois
EPA #	- ILD005152954
Closure	- $ 48,900
Post-Closure	- 0
Name	- Union Carbide Corporation Films Packaging Division
Address	- Bedford Park, Illinois
EPA #	- ILD000821462
Closure	- $ 4,650
Post-Closure	- 0
Name	- Union Carbide Corporation Polyolefins Division
Address	- Port Lavaca, Texas
EPA #	- TXD041515420
Closure	- $ 895,000
Post-Closure	- $2,040,000
Name	- Union Carbide Corporation Solvents & Coating Materials Division
Address	- Brownsville, Texas
EPA #	- TXD008114092
Closure	- $ 441,400
Post-Closure	- $ 53,600
Name	- Union Carbide Corporation Solvents & Coating Materials
Address	- Texas City, Texas
EPA #	- TXD000461533
Closure	- $4,047,590
Post-Closure	- $2,519,250
EPA #	- TXD980626782
Closure	- $2,927,200
Post-Closure	- $1,756,650

Name	- Union Carbide Corporation Ethylene Oxide/Glycol Division
Address	- Hahnville, Louisiana
EPA #	- LAD041581422
Closure	- $3,554,754
Post-Closure	- $ 151,000

4. This firm is the owner or operator of the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility:

None

This firm is required to file a form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended 1984.

1.	Sum of current closure and post-closure cost estimate.	$47,591,775
2.	Current Bond rating of most recent issuance of this firm and name of rating service.	Standard & Poor's BBB+ Moody's A3
3.	Date of issue of bond:	June 1, 1983
4.	Date of maturity of bond:	June 1, 2003
*5.	Tangible net worth	$3,998,813,000
*6.	Total assets in U.S. (required only if less than 90% of firm's assets are located in the U.S.)	$8,180,548,000

		Yes	No
7.	Is line 5 at least $10 million?	x	
8.	Is line 5 at least 6 times line 1?	x	
		Yes	**No**
*9.	Are at least 90% of firm's assets located in U.S.? If not, complete line 10.		x
10.	Is line 6 at least 6 times line 1?	x	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(f) as such regulations were constituted on the date shown immediately below.

Very truly yours,

J. C. Stephenson

J. Clayton Stephenson
Executive Vice President and
Chief financial Officer
October 10, 1985

0345F

KMG Main Hurdman

Certified Public Accountants

900 Bedford Street
Stamford, CT 06901-1104

Telephone: (203) 327 0000
Telex: 643673

The Board of Directors
Union Carbide Corporation

We have examined the consolidated balance sheet of Union Carbide Corporation and subsidiaries at December 31, 1984 and the related consolidated statements of income and retained earnings and of changes in financial position for the year then ended, and have issued our report thereon dated February 19, 1985. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In accordance with Subpart H of Title 40 CFR Parts 264 and 265 of the Code of Federal Regulations, we compared the data in Items 5, 6 and 9 of the letter from the Corporation's Chief Financial Officer dated October 10, 1985 in support of the Corporation's use of the financial test to demonstrate financial assurance, as specified in such regulations, with the audited financial statements.

In connection with the procedure referred to above, no matters came to our attention that caused us to believe that the specified data should be adjusted.

We understand that this report is intended solely to assist you in evaluating the Corporation's adherence to the requirements of Subpart H of Title 40 CFR Parts 264 and 265 of the Code of Federal Regulations.

October 10, 1985

KMG Main Hurdman

31108 13

UNION CARBIDE CORPORATION
COATINGS MATERIALS DIVISION
P.O. BOX 3370, BROWNSVILLE, TEXAS 78520

January 14, 1983

VIA CERTIFIED MAIL

Re: Annual Waste Summary (TDWR-0436A) for 1982
Ground-Water Monitoring Report (TDWR-0910)
Solid Waste Registration 31108

Texas Department of Water Resources
P. O. Box 13087 Capitol Station
Austin, TX 78711

Attention: Self-Reporting Sub-Unit
Enforcement and Field Operations

This does not address evaluation results & groundwater elevations required by 194(f)

Enclosed are the following reports for this facility:

1. Annual waste summary for 1982.

2. Ground-water monitoring data attached to the above summary.

   a. List of ground-water elevation and temperature measurements and analytical results for 23 parameters for each of the four wells.

   b. Form TDWR-0910 for each of the four wells.

3. Monthly waste shipment summary for 1982 fourth quarter.

According to TDWR's letter of July 1, 1982, from Mr. Harvey Davis, Executive Director, only 17 of the parameters included on Form TDWR-0910 are required to be analyzed annually (not quarterly) and the other 13 parameters included on the form are not required. Mr. Davis' letter also listed five other required parameters which are not included on this form. For this reason, a one page listing of ground-water monitoring data is attached to these reports (paragraph "2a" above).

The analyses of the ground-water samples indicate, as expected, that the ground-water is very brackish and is not contaminated by any parameters above normal background levels. The solid waste processing/disposal facility (surface impoundment), the four monitoring wells and the entire plant are surrounded on all four sides by salt water.

Should you have any questions concerning these reports, please contact me at 512/831-4501, extension 2281.

W. H. Davies

WHD:mfw
Attachment

W. H. Davies
Environmental Engineer

CC: John Sturgis, TDWR, Weslaco, TX
Greg Tipple, TDWR, Austin, TX

EPA TSD FAC. NO. TXD008114092

GROUND-WATER MONITORING DATA FOR SURFACE IMPOUNDMENT (BALL MILL PIT) FOR 12-2-82

Data as mg/l unless otherwise specified (date)

WELL NO. (DIRECTION)		MW-1 (S)	MW-2 (W)	MW-3 (N)	MW-4 (E)	
ELEVATION MEASUREMENTS						
h_T, ft. in.		25-2 7/8	19-7 3/4	21-9	22-10 3/4	
h_W, ft. in.		11-1 1/8	11-0 3/8	10-8 7/8	11-4	
$h_a = h_T - h_W$ ft.		14.146	8.615	11.010	11.563	
E_c, ft.		16.59	10.61	13.19	13.54	
$E_W = E_c - h_a$ ft. Grd.-water Elev.		2.44	2.00	2.18	1.98	
TIME MEASURED		0737	0741	0746	0753	
SAMPLED		0844	0910	0930	0946	
TEMPERATURE, °C.		26.8	25.4	25.2	26.4	
WR 335.48 APPENDIX II PARAMETERS RELATED						
DRINKING WATER STANDARDS	EPA MAX					
Arsenic	5	0.043	0.027	0.035	0.082	L.D.
Barium	100	N.D.	N.D.	N.D.	N.D.	2
Cadmium	1	N.D.	N.D.	N.D.	N.D.	0.05
Chromium (total)	5	N.D.	N.D.	N.D.	N.D.	0.1
Chromium (hexavalent)	—	N.D.	N.D.	N.D.	N.D.	0.1
Fluoride	—	1.32	0.97	1.48	0.89	
Lead	5	N.D.	N.D.	N.D.	N.D.	0.3
Mercury	0.2	N.D.	N.D.	N.D.	N.D.	0.01
Nitrate (as N)	—	0.15	0.23	0.14	0.21	0.05
Selenium	1	N.D.	N.D.	N.D.	N.D.	0.02
Silver	5	N.D.	N.D.	N.D.	N.D.	0.3
.193(b)(2) PARAMETERS RELATED						
GROUND-WATER QUALITY						
Chloride	—	3,660	15,000	2,150	19,200	
Iron	—	3.13	2.71	1.13	3.43	0.2
Manganese	—	1.37	4.01	0.96	5.91	0.05
Sodium	—	4,615	7,910	4,140	8,030	0.1
Sulfate	—	1,580	2,830	2,820	1,940	
.193(b)(3) PARAMETERS RELATED						
GROUND-WATER CONTAMINATION						
pH, Standard Units	—	6.98	6.60	7.20	6.46	
Total Organic Carbon	—	280	63	147	50	
CELLANEOUS PARAMETERS						
Total Dissolved Solids	—	10,700	31,700	9,300	49,000	
Bicarbonate	—	1,500	670	1,270	366	
Calcium	—	264	1,190	184	2,360	0.1
Magnesium	—	308	1,440	158	1,730	0.01
Potassium	—	3.60	5.70	2.24	7.94	0.5

- Distance from top of casing to bottom of well.
- Depth of water in well casing.

h_a = Ht. of air space from ground-water to top of casing.
E_c = Elevation of top of casing in ft. above M.S.L.

E_W = Elev. of ground-water.
N.D. = Not Detected
L.D. = Limit of Detection

W.H. Davies
1-5-83

...PARTMENT OF WATER RESOURCES
...ipping Control & Effluent Reports Unit
...nforcement and Field Operations
...O. Box 13087, Capitol Station
...ustin, Texas 78711

TDWR Generator's Registration No. or TSD Facility Permit No. 31108

EPA TSD Fac. No. or Gen. No. TXD008114092

Company Well Number MW-1

Gradient Up X Down

Report for: 12 19 82

GROUND WATER MONITORING REPORT FOR HAZARDOUS WASTE FACILITIES

...be completed by the owner/operator of a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste. (See reverse side for instructions.)

...mpany Name: Union Carbide Corporation, Solvents and Coatings Materials Division Phone: (512) 831-4501 Ext. 2281

...siness Address: P. O. Box 3370, Brownsville, TX Zip: 78520

...BLE 1

Parameter Units Sample Type	Ground Water Elev. Ft. Sample Occurence	pH Standard Grab	Conductivity µmhos mg/l Grab	Total Organic Carbon mg/l Grab	Total Organic Halogen mg/l Grab	Chloride mg/l Grab	Iron mg/l Grab	Manganese mg/l Grab	Phenols mg/l Grab	Sodium mg/l Grab	Sulfate mg/l Grab
...ate											
**First Year (initial) Background ...rithmatic mean		± **	± **	± **	± **						
12/2/82	2.44	6.98	----	280	----	3,660	3.13	1.37	----	4,615	1,580

...BLE 2

Parameter Units Sample Type	Arsenic mg/l Grab	Barium mg/l Grab	Cadmium mg/l Grab	Chromium mg/l Grab	Fluoride mg/l Grab	Lead mg/l Grab	Mercury mg/l Grab	Nitrate mg/l Grab	Selenium mg/l Grab	Silver mg/l Grab
...ate										
12/2/82	0.043	N.D.	N.D.	N.D.	1.32	N.D.	N.D.	0.15	N.D.	N.D.

N.D. = Not De...ted

Parameter Units Sample Type	Endrin mg/l Grab	Lindane mg/l Grab	Methoxychlor mg/l Grab	Toxaphene mg/l Grab	2,4-D mg/l Grab	2,4,5-TP Silvex mg/l Grab	Radium pCi/l Grab	Gross Alpha pCi/l Grab	Gross Beta [redacted] Grab	Coliform Bacteria 1/100 ml Grab
...ate										

...ertify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents and that based on my inquiry of those individuals ...mediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

W. H. Davies W H Davies

XAS DEPARTMENT OF WATER RESOURCES
ipping Control & Effluent Reports Unit
nforcement and Field Operations
O. Box 13087, Capitol Station
ustin, Texas 78711

TDWR Generator's Registration No. or TSD Facility Permit No. 3 1 1 0 8

EPA TSD Fac. No. or Gen. No. T X D 0 0 8 1 1 4 0 9 2

GROUND WATER MONITORING REPORT FOR HAZARDOUS WASTE FACILITIES

Company Well Number M W - 2

Gradient Up [ ] Down [X]

Report for: 1 2 19 8 2

o be completed by the owner/operator of a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste. (See reverse side for instructions.)

ompany Name: Union Carbide Corporation, Solvents and Coatings Materials Division Phone: (512) 831-4501 Ext. 2281

usiness Address: P. O. Box 3370, Brownsville, TX Zip: 78520

ABLE 1

Parameter Units Sample Type	Ground Water Elev. Ft. Sample Occurence	pH Standard Grab	Conductivity µmhos mg/l Grab	Total Organic Carbon mg/l Grab	Total Organic Halogen mg/l Grab	Chloride mg/l Grab	Iron mg/l Grab	Manganese mg/l Grab	Phenols mg/l Grab	Sodium mg/l Grab	Sulfate mg/l Grab
ate											
*First Year (initial) Background rithmatic mean		± **	± **	± **	± **						
12/2/82	2.00	6.60	----	63	----	15,000	2.71	4.01	----	7,910	2,830

ABLE 2

Parameter Units Sample Type	Arsenic mg/l Grab	Barium mg/l Grab	Cadmium mg/l Grab	Chromium mg/l Grab	Fluoride mg/l Grab	Lead mg/l Grab	Mercury mg/l Grab	Nitrate mg/l Grab	Selenium mg/l Grab	Silver mg/l Grab
ate										
12/2/82	0.027	N.D.	N.D.	N.D.	0.97	N.D.	N.D.	0.23	N.D.	N.D.

N.D. = Not Detected

Parameter Units Sample Type	Endrin mg/l Grab	Lindane mg/l Grab	Methoxychlor mg/l Grab	Toxaphene mg/l Grab	2,4-D mg/l Grab	2,4,5-TP Silvex mg/l Grab	Radium pCi/l Grab	Gross Alpha pCi/l Grab	Gross Beta millirem/yr. Grab	Coliform Bacteria 1/100 ml Grab
ate										

ertify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents and that based on my inquiry of those individuals mmediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

W. H. Davies W H Davies

nforcement and Field Operations
. O. Box 13087, Capitol Station
ustin, Texas 78711

TDWR Generator's Registration No. or TSD Facility Permit No. 3 1 1 0 8

EPA TSD Fac. No. or Gen. No. T X D 0 0 8 1 1 4 0 9 2

GROUND WATER MONITORING REPORT FOR HAZARDOUS WASTE FACILITIES

Company Well Number M W - 3

Gradient Up [ ] Down [X]

Report for: 1 2 19 8 2

o be completed by the owner/operator of a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste. (See reverse side for instructions.)

ompany Name: Union Carbide Corporation, Solvents and Coatings Materials Division Phone: (512) 831-4501 Ext. 2281

usiness Address: P. O. Box 3370, Brownsville, TX Zip: 78520

ABLE 1

Parameter Units Sample Type	Ground Water Elev. Ft. Sample Occurence	pH Standard Grab	Conductivity µmhos mg/l Grab	Total Organic Carbon mg/l Grab	Total Organic Halogen mg/l Grab	Chloride mg/l Grab	Iron mg/l Grab	Manganese mg/l Grab	Phenols mg/l Grab	Sodium mg/l Grab	Sulfate mg/l Grab
ate											
**First Year (initial) Background rithmatic mean		± **	± **	± **	± **						
12/2/82	2.18	7.20	----	147	----	2,150	1.13	0.96	----	4,140	2,820

BLE 2

Parameter Units Sample Type	Arsenic mg/l Grab	Barium mg/l Grab	Cadmium mg/l Grab	Chromium mg/l Grab	Fluoride mg/l Grab	Lead mg/l Grab	Mercury mg/l Grab	Nitrate mg/l Grab	Selenium mg/l Grab	Silver mg/l Grab
te										
12/2/82	0.035	N.D.	N.D.	N.D.	1.48	N.D.	N.D.	0.14	N.D.	N.D.

N.D. = Not Dete d

Parameter Units Sample Type	Endrin mg/l Grab	Lindane mg/l Grab	Methoxychlor mg/l Grab	Toxaphene mg/l Grab	2,4-D mg/l Grab	2,4,5-TP Silvex mg/l Grab	Radium pCi/l Grab	Gross Alpha pCi/l Grab	Gross Beta millirem/yr. Grab	Coliform Bacteria 1/100 ml Grab
te										

tify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents and that based on my inquiry of those individuals mediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

W. H. Davies W. H. Davies

Shipping Control & Effluent Reports Unit
Enforcement and Field Operations
P. O. Box 13087, Capitol Station
Austin, Texas 78711

TDWR Generator's Registration No. or TSD Facility Permit No. 31108

EPA TSD Fac. No. or Gen. No. TXD008114092

GROUND WATER MONITORING REPORT FOR HAZARDOUS WASTE FACILITIES

Company Well Number MW-4

Gradient Up [ ] Down [X]

Report for: 12 19 82

To be completed by the owner/operator of a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste. (See reverse side for instructions.)

Company Name: Union Carbide Corporation, Solvents and Coatings Materials Division Phone: (512) 831-4501 Ext. 2281

Business Address: P. O. Box 3370, Brownsville, TX Zip: 78520

TABLE 1

Parameter Units Sample Type	Ground Water Elev. Ft. Sample Occurence	pH Standard Grab	Conductivity µmhos mg/l Grab	Total Organic Carbon mg/l Grab	Total Organic Halogen mg/l Grab	Chloride mg/l Grab	Iron mg/l Grab	Manganese mg/l Grab	Phenols mg/l Grab	Sodium mg/l Grab	Sulfate mg/l Grab
Date											
**First Year (initial) Background arithmatic mean		± **	± **	± **	± **						
12/2/82	1.98	6.46	----	50	----	19,200	3.43	5.91	----	8,030	1,940

TABLE 2

Parameter Units Sample Type	Arsenic mg/l Grab	Barium mg/l Grab	Cadmium mg/l Grab	Chromium mg/l Grab	Fluoride mg/l Grab	Lead mg/l Grab	Mercury mg/l Grab	Nitrate mg/l Grab	Selenium mg/l Grab	Silver mg/l Grab
Date										
12/2/82	0.082	N.D.	N.D.	N.D.	0.89	N.D.	N.D.	0.21	N.D.	N.D.

N.D. = Not Detected

Parameter Units Sample Type	Endrin mg/l Grab	Lindane mg/l Grab	Methoxychlor mg/l Grab	Toxaphene mg/l Grab	2,4-D mg/l Grab	2,4,5-TP Silvex mg/l Grab	Radium pCi/l Grab	Gross Alpha pCi/l Grab	Gross Beta millirem/yr. Grab	Coliform Bacteria 1/100 ml Grab
Date										

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

W. H. Davies W. H. Davies

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

August 17, 1981

Union Carbide Corp. (Amended Forms)
Attn: L.T. Windell
P.O. Box 3370
Brownsville, Texas 78520

EPA ID NUMBER: TXD 00 811 4092

FACILITY LOCATION: Hwy 48 Port of Brownsville
Brownsvile, Texas

This is to acknowledge that the Environmental Protection Agency has completed processing the information submitted in your Part A Hazardous Waste Permit Application. It is the Agency's opinion, based on the assumption that the information submitted is complete and accurate, you as an owner or operator of a hazardous waste management facility have met the requirements of Section 3005(e) of the Resource Conservation and Recovery Act (RCRA) for Interim Status. EPA has not verified the information submitted. If it is determined that the information is incomplete or inaccurate, you may be asked to provide additional information or in certain circumstances it may be determined that you do not qualify for interim status. In addition, this notice does not preclude a citizen from taking legal action under the provisions of Section 7002 of RCRA.

A facility not meeting the requirements for interim status under Section 3005 of RCRA may be required to close until such time as a hazardous waste permit is issued. Interim status may also be terminated, according to procedures in 40 CFR Part 124, if the owner or operator fails to furnish additional information which EPA requests in order to process a permit application.

As an owner or operator of a hazardous waste management facility, you are required to comply with the interim status standards as prescribed in 40 CFR Parts 122 and 265 or with State rules and regulations in those States which have been authorized under Section 3006 of RCRA. In addition, you are reminded that operating under interim status does not relieve you from the need to comply with all applicable State and local requirements.

The enclosure to this letter identifies the processes your facility may use, their design capacities and the types of waste your facility may accept during interim status. This information was obtained from the Part A Permit Application. If you wish to handle new wastes, change processes, increase the design capacity of existing processes, or change ownership or operational control of the facility, you may do so only as provided in 40 CFR Sections 122.22 and 122.23.

If you have any questions concerning this letter, please contact Dwight Corley at (214) 767-2765, or write Mail Code 6E-P, 1201 Elm Street, Dallas, Texas 75270.

Sincerely,

Diana Dutton, Director
Enforcement Division (6E)

cc: Texas Department of Water Resources

CONDITIONS OF OPERATION DURING
INTERIM STATUS

Date prepared: August 17, 1981

The information shown below is based solely on the information that the owner and operator of this facility submitted in Part A of the Hazardous Waste Permit Application. This is not a determination by EPA that this facility is an environmentally acceptable facility for treating, storing or disposing of the hazardous wastes listed below.

I. Facility name, location and EPA identification number:

Name: Union Carbide Corporation (Amended Form)

Location: Brownsville Port

Brownsville, Texas

EPA ID No: TXD 00 811 4092

II. EPA considers the following to be the owner or operator of the facility and therefore the person(s) who must comply with the requirements set forth in 40 CFR Parts 122 and 265:

Owner's name: Brownsville Navigation District

Operator's name: Union Carbide Corp.-Brownsville Plant

III. During the period of interim status, the facility may use only the following processes for treating, storing or disposing of hazardous waste, up to the design capacities that are indicated:

Process Code	Design Capacity Amount	Unit of Measure
S02	289,900.	Gallons
T03	2.500	Tons per hour
S01	900.	Gallons
T02	7,000.	Gallons per day

IV. During the period of interim status, the facility may handle only the hazardous wastes with the following EPA Hazardous Waste Numbers, and/or solid wastes exhibiting hazardous characteristics with the following EPA Hazardous Waste Numbers:

U123 D001 D007 D002 F001

EPA Region VI, Dallas, TX 75270
(214) 767-2765

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

July 27, 1981

Union Carbide Corp.
Attn: L.T. Windell
P.O. Box 3370
Brownsville, Texas 78520

EPA ID NUMBER: TXD 00 811 4092

FACILITY LOCATION: Hwy 48 Port of Brownsville
Brownsville, Texas

This is to acknowledge that the Environmental Protection Agency has completed processing the information submitted in your Part A Hazardous Waste Permit Application. It is the Agency's opinion, based on the assumption that the information submitted is complete and accurate, you as an owner or operator of a hazardous waste management facility have met the requirements of Section 3005(e) of the Resource Conservation and Recovery Act (RCRA) for Interim Status. EPA has not verified the information submitted. If it is determined that the information is incomplete or inaccurate, you may be asked to provide additional information or in certain circumstances it may be determined that you do not qualify for interim status. In addition, this notice does not preclude a citizen from taking legal action under the provisions of Section 7002 of RCRA.

A facility not meeting the requirements for interim status under Section 3005 of RCRA may be required to close until such time as a hazardous waste permit is issued. Interim status may also be terminated, according to procedures in 40 CFR Part 124, if the owner or operator fails to furnish additional information which EPA requests in order to process a permit application.

As an owner or operator of a hazardous waste management facility, you are required to comply with the interim status standards as prescribed in 40 CFR Parts 122 and 265 or with State rules and regulations in those States which have been authorized under Section 3006 of RCRA. In addition, you are reminded that operating under interim status does not relieve you from the need to comply with all applicable State and local requirements.

The enclosure to this letter identifies the processes your facility may use, their design capacities and the types of waste your facility may accept during interim status. This information was obtained from the Part A Permit Application. If you wish to handle new wastes, change processes, increase the design capacity of existing processes, or change ownership or operational control of the facility, you may do so only as provided in 40 CFR Sections 122.22 and 122.23.

If you have any questions concerning this letter, please contact Dwight Corley at (214) 767-2765, or write Mail Code 6E-P, 1201 Elm Street, Dallas, Texas 75270.

Sincerely,

Diana Dutton, Director
Enforcement Division (6E)

cc: Texas Department of Water Resources

CONDITIONS OF OPERATION DURING
INTERIM STATUS

Date prepared: July 27, 1981

The information shown below is based solely on the information that the owner and operator of this facility submitted in Part A of the Hazardous Waste Permit Application. This is not a determination by EPA that this facility is an environmentally acceptable facility for treating, storing or disposing of the hazardous wastes listed below.

I. Facility name, location and EPA identification number:

Name: Union Carbide Corporation

Location: Brownsville Port
Brownsville, Texas

EPA ID No: TXD 00 811 4092

II. EPA considers the following to be the owner or operator of the facility and therefore the person(s) who must comply with the requirements set forth in 40 CFR Parts 122 and 265:

Owner's name: Brownsville Navigation District.

Operator's name: Union Carbide Corp.-Brownsville Plant

III. During the period of interim status, the facility may use only the following processes for treating, storing or disposing of hazardous waste, up to the design capacities that are indicated:

Process Code	Design Capacity Amount	Unit of Measure
S02	289,900.	Gallons
T03	2.500	Tons per day
S01	900.	Gallons
T02	7,000.	Gallons per day

IV. During the period of interim status, the facility may handle only the hazardous wastes with the following EPA Hazardous Waste Numbers, and/or solid wastes exhibiting hazardous characteristics with the following EPA Hazardous Waste Numbers:

U123 D001 D007 D002 F001 nonspecific sources → spent halogenated solvents

EPA Region VI, Dallas, TX 75270
(214) 767-2765

TEXAS WATER COMMISSION

June 16, 1986

Mr. W. W. McManus,
Plant Manager
Union Carbide Corporation
Star Route Box 90
Brownsville, Texas 78520

Re: Union Carbide Corporation (UCC)
Industrial Solid Waste Registration No. 31108
Full Facility Closure

Dear Mr. McManus:

We have completed an initial review of the closure plan submitted by letter dated November 1, 1985 for the Ball Mill Residue Basin, Incinerator, Tank 3326, and Tank 5211 (Facility Nos. 02, 03, 04, and 05, respectively, on your Notice of Registration). Our review indicates that additional information will be required prior to Executive Director approval of the closure plan. The noted deficiencies and our recommendations are detailed below:

Ball Mill Residue Basin

1. Please indicate in the revised closure plan which EPA-approved test methods were used to analyze the standing liquids, sludge, soil, and ground water.

2. Table I in the Notice of Registration lists the EPA Hazardous Waste numbers for each waste number. The EPA Hazardous Waste numbers tabulated in Table I of the Notice of Registration do not correspond to the TWC Sequence Numbers in Table III-1 of the Part A application. Please revise the Part A application to clarify this apparent discrepancy.

3. Pursuant to 40 CFR 265.115, both the owner or operator and an independent Registered Professional Engineer must submit certification that the facility has been closed in accordance with the specifications in the approved closure plan. Please include a statement in the revised closure plan that certification will be provided in the final data report for the Ball Mill Residue Basin.

4. Presently it is unclear what UCC intends to do with the waste and waste residues remaining in the surface impoundment. Pursuant to 31 Texas Administrative Code (TAC) 335.6(f), the industrial solid waste remaining in-place must be classified in accordance with Technical Guideline No. 1, (copy enclosed). Furthermore, if UCC does not intend to use the surface impoundment in the future and intends to leave industrial solid waste in place, then UCC is required to notify the Agency of the closure activities in accordance with 31 TAC 335.6(g). We feel that inactive surface impoundments containing waste should be closed in accordance with Technical Guideline Nos. 3 and 6 in order to minimize contaminant migration to the ground water. In addition, if UCC intends to operate the surface impoundment for non-hazardous waste, the integrity of the liner in the unit should be assessed prior to commencing placement of non-hazardous waste in the unit. We request that a further review of the planned management activities for the Ball Mill Residue Basin be conducted and a proposed plan and schedule be submitted which incorporates the aforementioned requirements and recommendations. This information should be included in the revised closure plan.

Status of Ground Water Beneath the Ball Mill Residue Basin

1. UCC indicated in Section 2 of the closure plan that the waiver agreement does not require UCC to conduct statistical determinations of potential ground-water contamination. However, the letter from the Texas Department of Water Resources to UCC dated July 1, 1982 (submitted as Attachment B in the closure plan) specifies that the annual report should be submitted in accordance with 31 TAC 335.175(b). This regulation adopts by reference the requirements of 31 TAC 335.194(b) which require that statistical determinations be performed on ground-water monitoring data. The closure plan should therefore be revised to include the statistical determinations required by 31 TAC 335.194(b).

2. It appears that the ground-water elevation data submitted as Attachment C in Section 2 of the closure plan indicates MW-1 to be upgradient for years 1982 through 1984, and MW-3 to be slightly upgradient in 1985. The closure plan indicates MW-4 as the upgradient well. Please provide an evaluation of the ground-water monitoring system for this unit which includes a discussion of how the system complies (or fails to comply) with the requirements of 40 CFR Part 265 Subpart F.

3. Based on the ground-water data submitted as Attachment C, it appears that ground-water contamination may have occurred as indicated by the elevated levels of TOC in monitoring well MW-1. The Hazardous and Solid Waste Enforcement Section has been notified of this matter and their comments will be forthcoming by separate letter. Please be advised that ground-water monitoring in accordance with 40 CFR Part 265 Subpart F must be continued until closure of the Ball Mill Residue Basin has been completed pursuant to an approved closure plan.

4. We feel it is important to inform you that recent correspondence from the U.S. Environmental Protection Agency (EPA) has clarified their position on the applicability of 40 CFR Part 264, Subpart F ground-water monitoring requirements to regulated units which close in accordance with the interim status closure requirements (see enclosed correspondence). The correspondence from EPA indicates that "you may be required, depending on the extent of contamination that remains after Part 265 closure, to undertake additional activities at a later date to come into compliance with applicable Part 264 ground-water monitoring and corrective action standards. The final test of whether additional activities will be required is whether the closed unit would have had additional Part 264 ground-water monitoring and corrective action obligations had it closed pursuant to a permit (recall that Section 3005(i) imposes the same Subpart F requirements on interim status units that they would have had if they had been permitted)."

Since the closure plan presently does not propose the removal of all waste and waste residues, there is a strong likelihood that post-closure requirements will be imposed on this facility.

Incinerator, Tank 3326, and Tank 5211 Closure Plan

Incinerator:

a. Please submit a scaled plan-view drawing of the incinerator area and include locations of the proposed soil sampling and the background soil sampling locations. Background soil analyses should be performed in an area unaffected by waste management activities. In addition, the plan-view drawing of the incinerator area should include the areal extent of soil removal in the event soil contamination is identified. Please include on the plan-view drawing the location of the proposed soil samples to verify if additional contaminated soil excavation is necessary.

b. The closure plan must be revised to provide for the removal of all waste residues from the incinerator, regardless of the waste classification of the residue. This requires that the incinerator stack, pipes, pumps, and all appurtenances be decontaminated. At the end of the cleaning operation, the wash water should be analyzed for formic acid to verify that decontamination is complete. The analyses of the wash water should be included in the final data report. Please provide for a visual inspection that all waste has been removed as well as a sampling and analysis plan which will verify that decontamination is complete.

c. The District 11 Field Office should be notified in writing at least 10 days prior to the commencement of the proposed closure activities. In the event that analyses of soils indicate contamination, the District 11 Field Office should be notified and informed of the proposed excavation procedures. The revised closure plan should include these modifications.

d. The closure plan should be revised to include the EPA-approved test methods which will be used in the proposed analyses.

e. One background soil sample is not adequate to establish background pH, metal, and TOC concentrations. It is our position that at least four background soil samples in an area unaffected by waste management activities should be used to establish background. Please note that the concentration of each of the parameters analyzed for in the soil samples surrounding the incinerator must be less than or equal to the mean of the background samples plus two standard deviations in order to be considered decontaminated.

f. The analysis should include those metals listed in Table I of 40 CFR 261.24 which are reasonably expected to have been in the waste stream incinerated at this unit. Please indicate in the revised closure plan which metals will be analyzed.

g. Please include a statement in the revised closure plan that any contaminated soil, as determined by visual inspection, will be removed and properly disposed.

Tank 3326:

To verify that the tank has been properly cleaned, samples of the final wash water should be collected and analyzed for formic acid and chromium. These data should be submitted with the closure certification.

Tank 5211:

a. Please indicate how UCC intends to determine if additional cleaning of Tank No. 5211 is needed. In addition, please verify decontamination by the method outlined for Tank 3326.

b. Table I of the closure schedule indicates that by day 59, the incinerator will be inspected and certified. Please modify the schedule to indicate that Tank 5211 will be inspected and certified.

Other:

a. The final report submitted with the certification should summarize all aforementioned sampling and analysis data and procedures. Please indicate in the revised closure plan that UCC will submit all data generated during closure.

b. Pursuant to 31 TAC 335.5(b), proof of recordation is required prior to instituting disposal operations. If it is UCC's intention to dispose of waste at this facility, UCC should submit proof of recordation with the closure certification.

In accordance with 31 TAC 335.6, we request that plans and specifications be assembled and submitted, reconciling the deficiencies noted above. Your response to this request should be submitted within 30 days of the date of this letter. Two copies of your response are required. Should you have any questions regarding our review, or if you would like to arrange a conference in Austin to discuss our review in detail, please contact Scott G. Huling of this Unit at AC512/463-8172.

Sincerely,

Dwight C. Russell, Head
Facility Unit III
Permits Section
Hazardous & Solid Waste Division

SGH:jr

Enclosures

cc: Bill Brown, Field Operations Liaison, H&SW Division
Ray Austin, Permits Section, H&SW Division
Russ Kimble, Reports and Management Group, H&SW Division
Larry Smith, TWC District 11 Office - Weslaco

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 9 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Neutralization Surface Impoundments

FROM: Marcia Williams, Director
Office of Solid Waste

TO: James H. Scarbrough, Chief
Residuals Management Branch
EPA Region IV

Over the past several months, we have been communicating with your staff and representatives of Travenol Laboratories, Inc., concerning the need for ground-water monitoring at Travenol's interim status equalization/neutralization lagoon at Cleveland, Mississippi. According to the Mississippi Department of Natural Resources, Travenol has a valid ground-water monitoring waiver under the State equivalent of Section 265.90(e). Travenol would like to close the neutralization lagoon as a hazardous waste management unit.

The attached letter states our policy regarding the need for ground-water monitoring at closing or closed neutralization surface impoundments generally, and the Travenol lagoon specifically. Our policy is based on the requirements of Section 3005(i) of the Hazardous and Solid Waste Amendments of 1984, which require that any surface impoundment that receives hazardous waste after July 26, 1982, meet the Part 264 Subpart F requirements that are applicable to new units. As you know, unlike Section 265.90(e), Subpart F of Part 264 does not contain a ground-water monitoring waiver for neutralization surface impoundments. The attached letter is also responsive to a memorandum you sent to John Skinner on July 13, 1984, regarding ground-water monitoring requirements for neutralization surface impoundments that are being permitted.

Should you or your staff have any questions on our policy, please contact Kent Anderson at FTS-382-4654.

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 9 1986

RECEIVED
APR 14 1986
OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE

Mr. William Blackburn
Travenol Laboratories, Inc.
Deerfield, Illinois 60015

Dear Mr. Blackburn:

This is in response to your letter of August 8, 1985, to John Skinner, then Director of the Office of Solid Waste, regarding whether or not ground-water monitoring is a required condition for closure of your firm's interim status equalization/neutralization lagoon at Cleveland, Mississippi.

We are providing you with this response even though the issue of "beneficial reuse" of your deionization waste (raised in your letter of November 8, 1985) is not yet resolved. On that issue, we are awaiting further information from you. We recognize that resolution of the "beneficial reuse" issue may impact the need for implementation of the options discussed in this response.

From the information that you have provided us, it appears that you intend at closure of this hazardous waste surface impoundment merely to stop managing "hazardous waste" (this may include removal of liquids in the impoundment at the time of closure). Apparently, your basis for the appropriateness of this closure action is found in Section 265.228(b) of our interim status regulations, as well as in an equivalent requirement of the Mississippi Department of Natural Resources (MDNR).

Prior to enactment of the Hazardous and Solid Waste Amendments of 1984 (HSWA), surface impoundments could close under interim status and be exempt from all future Part 265 ground-water monitoring obligations by demonstrating under §265.228(b) that any standing liquids, waste and waste residues, liners, and contaminated soils left in place at closure were not "hazardous wastes." However, Section 3005(i) of HSWA imposes additional requirements on certain interim status land treatment, storage, and disposal units (including surface impoundments) that received hazardous waste after July 26, 1982. Section 3005(i) requires "any" surface

impoundment that receives hazardous waste after July 26, 1982, to meet the Part 264 Subpart F requirements that are applicable to new permitted units. EPA believes that Congress intended all surface impoundments that received hazardous waste after that date to meet the applicable Part 264 Subpart F requirements, regardless of whether interim status closure requirements are satisfied. Since the equalization/neutralization impoundment at Cleveland, Mississippi, has received hazardous waste since July 26, 1982, the requirements of Section 3005(i) apply.

Section 3005(i) does not prohibit you from closing your unit under the existing interim status closure standards; rather, it means that you may be required, depending on the extent of contamination that remains after Part 265 closure, to undertake additional activities at a later date to come into compliance with applicable Part 264 ground-water monitoring and corrective action standards. The final test of whether additional activities will be required is whether the closed unit would have had additional Part 264 ground-water monitoring and corrective action obligations had it closed pursuant to a permit (recall that §3005(i) imposes the same Subpart F requirements on interim status units that they would have had if they had been permitted).

Since under Part 264 the type of closure determines whether a permitted unit has outstanding Subpart F requirements, the relevant question for determining which interim status closures may have additional obligations vis-a-vis §3005(i) is whether the unit has met the Part 264 closure by "removal or decontamination" standard (§264.228(a)). [1] Where the applicant can demonstrate that he has already met the Part 264 "removal or decontamination" standard, no outstanding Part 264 Subpart F requirements would be deemed applicable under §3005(i), and, thus, the Agency would not compel additional activities through a post-closure permit.

---

1 There is a substantial difference in the "removal or decontamination" requirement of Section 264.228(a) from closure under Section 265.228(b). A material that is demonstrated to no longer meet the regulatory definition of "hazardous waste" under Section 265.228(b) may be left in place even if the material is contaminated. Under Section 264.228(a), removal or decontamination in such a situation must proceed further. The presence of contamination would be evaluated by analyzing the presence and levels of Appendix VIII constituents. Interim status surface impoundments that cannot meet the Section 264.228(a) removal or decontamination standard would be required by the Agency to comply with Subpart F of Part 264.

To close under Section 264.228(a), all waste residues (if these contain hazardous constituents listed in Appendix VIII of Part 261), contaminated containment system components (liners, etc.), and structures and equipment contaminated with waste and leachate must be removed or decontaminated. In addition, unsaturated subsoils underlying the impoundment and saturated subsoils (ground water) should be sampled and analyzed for the presence of Appendix VIII constituents that are expected to have entered the impoundment.

Therefore, although your company has several options for closure of the equalization/neutralization lagoon, all of the options at some time will require monitoring for constituents in ground water. The issue is one of timing. Your company may either (1) close the lagoon under Section 265.228(b) without installing wells but remain subject to future requirements including ground-water monitoring and corrective action as necessary through a post-closure permit; (2) close the lagoon under Section 265.228(c) and install wells once your post-closure permit is called (neutralization impoundments are not exempted from Part 264 ground-water monitoring and, therefore, would have to generate the ground-water monitoring data needed to decide which Part 264 Subpart F program--detection monitoring, compliance monitoring, or corrective action--should be incorporated in your permit); or (3) close the lagoon under Section 265.228(b) and voluntarily install wells and keep records of the levels of ground water and soil contamination found and removed at the impoundment to substantiate your position that you have met the Part 264 closure by removal standard and, therefore, should not be required to obtain a post-closure permit.

I hope that this has answered your questions regarding the need for ground-water monitoring at closure of your interim status equalization/neutralization lagoon at Cleveland, Mississippi.

Sincerely,

Marcia Williams
Director
Office of Solid Waste

cc: Tom Devine, Director, Air and Hazardous Materials Division, EPA Region IV
James H. Scarbrough, Chief, Residuals Management Branch, EPA Region IV
David Lee, Mississippi Department of Natural Resources

TOPIC: WASTE EVALUATION/CLASSIFICATION

Purpose:

The purpose of this guideline is to describe the classification system defined by the Rules of the Texas Water Commission (TWC) in Chapter 335 of the Texas Administrative Code. This classification system is based on the potential adverse impact that certain types or classes of industrial solid waste may have on human health or the environment.

Definitions:

Below are several definitions which are the basis for the waste classification system.

1. Class I Wastes - any industrial solid waste or mixture of industrial solid wastes which because of its concentration, or physical or chemical characteristics, is toxic, corrosive, flammable, a strong sensitizer or irritant, a generator of sudden pressure by decomposition, heat, or other means, and may pose a substantial present or potential danger to human health or the environment when improperly processed, stored, transported, or disposed of or otherwise managed, including hazardous industrial waste.

2. Class II Wastes - any individual solid waste or combination of industrial solid waste which cannot be described as Class I or Class III.

3. Class III Wastes - inert and essentially insoluble industrial solid waste, including materials such as rock, brick, glass, dirt, and certain plastics and rubber, etc., that are not readily decomposable.

4. Essentially Insoluble - any material which, if representatively sampled and placed in static or dynamic contact with deionized water at ambient temperature for seven days, will not leach any quantity of any constituent of the material into the water in excess of current United States Public Health Service or United States Environmental Protection Agency limits for drinking water as published in the Federal Register.

5. Hazardous Industrial Waste - any industrial solid waste or combination of industrial solid wastes identified or listed as a hazardous waste by the Administrator of the United States Environmental Protection Agency pursuant to Section 3001 of the Resource Conservation and Recovery Act of 1976. The Administrator has identified the characteristics of hazardous wastes and listed certain wastes as hazardous in Title 40 of the Code of Federal Regulations, Part 261, Subparts C and D, respectively.

Classification:

Waste classification is based upon information supplied by the waste generator. In most cases the initial classification of a waste material will be based upon readily available information and a conservative comparison with the definition of each class of wastes. The waste generator may submit detailed waste descriptions for the purpose of classification or a review of the classification of the waste.

Pursuant to TWC Rules, it is the responsibility of the generator of a solid waste to determine if the waste is hazardous. Hazardous wastes are defined in Title 40, Code of Federal Regulations (40 CFR) Part 261.3.

Class I wastes include all hazardous wastes as well as materials which are toxic or carcinogenic, mutagenic, teratogenic, bioaccumulative, or persistent. Data about these characteristics may be found in published literature or determined experimentally. For the purpose of this classification scheme, a waste is considered acutely toxic when the oral LD_{50} of the material tested on a rat is less than 500 mg/kg, when the inhalation LC_{50} of the material tested on a rat is less than 2 mg/l, or when the dermal LD_{50} of the material tested on a rabbit is less than 200 mg/kg. (LD_{50} is a statistically calculated dose of a material necessary to cause the death of 50% of an entire test animal population and is usually expressed in terms of milligrams of chemical per kilogram of animal).

Class II wastes are materials which do not have the properties of Class I or Class III wastes. These wastes may have properties such as combustibility, biodegradability, and/or solubility in water. A Class II waste might leach constituents in excess of the limits for drinking water when in contact with deionized water.

Class III wastes are inert and essentially insoluble materials. These wastes, when observed in a leachate test, do not leach any constituent in excess of the limits for drinking water.

Waste Evaluation:

Industrial solid wastes which are determined to be non-hazardous may be characterized by criteria such as flammability or ignitability, corrosivity, carcinogenicity, skin or eye irritation, reactivity, the presence of hazardous constituents (40 CFR Part 261, Appendix VIII), solubility, inertness, or other relevant characteristics.

Distilled WAter Leachate Test - (See below)
This leachate test is one criteria used to distinguish between Class II and Class III by providing information pertaining to solubility.

Distilled Water Leachate Test

A. For a dry solid waste, i.e., a waste material without any free liquid associated with it:

1. Place a 250 gm. (dry weight) representative sample of the waste material in a 1500 ml. Erlenmeyer flask.*

2. Add one liter of deionized or distilled water to the flask and mechanically stir the material at a low speed for five (5) minutes.

3. Stopper the flask and allow to stand for seven (7) days.

4. Filter the supernatant solution through a .45 micron filter.

5. The filtered leachate should be subjected to a quantitative analysis for those component or ionic species identified in the analysis of the waste itself.

*NOTE: Quadruplicate samples of the waste should be leached and all results reported.

B. For wastes with free liquids, the liquid portion of the waste should be considered to be the leachate in step 5 above.

C. For sludge and slurries and other waste material containing particulate matter, the waste should be subjected to a separation procedure (i.e., filtration, centrifugation) sufficient to separate the liquid portion from the solids. The solids should then be leached as in A above, and data on both the liquid portion and the leachate should be submitted.

Reclassification Procedure:

A written request for waste reclassification may be made by the generator at any time. All information applicable to the waste being considered for reclassification should be submitted. The attached form may be used as a guide to reclassification. The nature of the waste and its initial classification determine which of the items listed below will be required for reclassification.

1. A description of the process or processes from which the waste is generated.

2. A quantitative analysis for the constituents which could reasonably be expected to be present in the waste due to the process or processes from which the waste was generated.

3. A quantitative analysis of the liquid fraction of the waste or of a leachate from the waste. Quadruplicate leachate tests shall be performed and all data reported.

LANDFILLING

Industry has made considerable progress in reducing quantities of wastes which it generates and in developing new, economically feasible, environmentally acceptable methods of treatment and ultimate disposal of wastes. However, despite new ideas and the progress that has been made, the practice of "landfilling," which is one of the oldest waste disposal techniques used by man, is still the most widely practiced method of disposing of industrial solid wastes. The Texas Department of Water Resources (TDWR) is aware that burial of wastes is not the only or the final solution to disposal problems, but it is a necessity until other disposal, treatment, or recycling techniques can be employed. This Agency believes that many waste materials can be placed in the ground at a properly located and constructed landfill in such a manner as to preclude contamination of ground-water and surface-water supplies if the factors presented herein are given proper consideration.

Waste management planning should begin with identification and characterization of the expected wastes and a determination of management methods, such as incineration, landfarming, or landfilling, which can best treat or dispose of those wastes. Site selection should be directed to finding a location with the combination of factors which is suitable for the particular facility components which are to be constructed. A landfill design should provide for efficiency, safety, and environmental protection during active operation, and should also specify interim and final landfill closure procedures which will assure long-term waste containment with minimum post-closure maintenance. Planning closure before starting construction makes the eventual closure easier, more effective, and less costly. For example, stockpiling adequate clay from soils which are excavated from a landfill can eliminate the need, years later, of buying clay to cover and close the landfill. Plans for post-closure care should include such activities as ground-water monitoring, removing leachate from a leachate collection system, and maintaining the cover by periodic regrading, reseeding, and mowing. Closure and post-closure planning is a necessary component of landfill designs. TDWR Technical Guideline No. 2, "Industrial Solid Waste Landfill Site Selection," contains specific recommendations on landfill siting.

GENERAL CONSIDERATIONS

The pollution potential of a landfill depends on a number of things such as: (1) the reactivity of the waste as measured by content of organic matter, soluble inorganic constituents, readily oxidized substances, etc.; (2) the physical stability of the waste deposit in terms of volume change (mostly shrinkage) as decomposition takes place; (3) the geologic and hydrologic parameters of the site including the thickness, porosity and permeability of the formation in which the landfill is located; topography of the site area; and proximity of the water table to the fill; (4) how effectively the upper surface of the fill is protected from erosion and other disruptions; and (5) climate, including temperature, annual precipitation, intensity of rainfall, and net evapotranspiration.

All of these factors (discussed further below) should be given careful consideration if waste disposal by landfilling is to be conducted properly.

Reactivity of the Waste

The wastes to be disposed of should be classified in accordance with the Texas Department of Water Resources' Technical Guideline on Waste Classification. In addition, it is recommended that the effect of Class I or II wastes on soils or lining materials to be used as waste containment barriers be determined by testing. The object of such testing is to determine if the flowable constituents or the water extractable constituents of the wastes have any detrimental effect (causing dissolution, shrinkage, increase in permeability, etc.) on the soils or lining materials which are used as barriers to waste migration. Wastes that have a significant detrimental effect on materials being used as permanent barriers for waste containment should not be landfilled unless the wastes can be treated to eliminate the detrimental effects. Wastes should be evaluated for compatability with other wastes, as indicated in Technical Guideline No. 9. Noncompatible wastes should be segregated in storage and disposal operations.

Physical Stability of the Waste

While the possibility does exist of volume changes due to both expansion and contraction, subsidence or settlement of fill areas will be the most commonly encountered situation. Subsidence of fills is normally due to decomposition, dewatering, and differential compaction of the waste materials. The total amount of settlement that will occur at any given landfill will be a function of the total depth of the waste, the initial degree of compaction, and the composition of the waste. Most of the settlement occurs within the first 12 months. By the end of two years, most fills have completed settlement. The amount of settlement can vary greatly, but settlement between 5 and 10 percent is fairly common in Class I landfills.

Appreciable settlement in a landfill can result in a depression on the landfill surface and thus cause rainwater to pool. Settlement can also produce cracks in the final cover which, in combination with ponded water, will result in greatly increased infiltration. This rainwater serves as a source of water to leach pollutants from deposited wastes, possibly causing contaminants to be carried down into the ground water. The surface of the fill should be graded to insure good drainage and eliminate depressions that might trap rain. Periodic inspections and maintenance should be conducted after closure of a fill area to determine if regrading or additional cover material is necessary.

Waste Containment Barrier

Landfills should be provided with a barrier to provide for the long-term containment of waste materials. This section provides guidance with regard to the engineering design, including construction and material specifications, of waste containment barriers. Technical Guideline No. 2 provides guidance with regard to favorable geologic or natural conditions which provide an optimal industrial waste landfill location. That guideline is intended primarily to identify environmentally sound locations for Class I landfills, but the Technical Siting Criteria (Section II) should alsc be consulted when evaluating a proposed Class II landfill location. The waste containment barrier for each landfill will be evaluated individually, but if natural in-place soils, a constructed liner of soil materials, or a synthetic membrane liner are to be used, then the barrier should meet at least the following minimum recommendations. More stringent facility engineering design features may be warranted if the recommended barrier, in combination with the natural geologic setting, do not provide assurance of effective long-term isolation of industrial solid waste. The permitting regulations for hazardous waste landfills require a synthetic membrane liner in addition to an in-place or constructed soil liner.

TABLE I

RECOMMENDED SOIL SPECIFICATIONS

Parameter	Waste Classification		
	I	II	III
In-place soil thickness or Compacted soil liner thickness	4' 3'	3' 2'	** **
Permeability* (in cm/sec)	$<1x10^{-7}$	$<1x10^{-7}$	-
% passing no. 200 sieve	>30	>30	-
Liquid limit	>30	>30	-
Plasticity index	>15	>15	-

*Laboratory permeability is to be determined with water and with an appropriate waste-contaminated liquid which is derived from the wastes which are expected to be placed in the landfill. If a liquid phase of the waste is present, it should be used as the waste-contaminated liquid. Otherwise, a representative leachate of the wastes would be the waste-contaminated permeating liquid in the test. If in-place soil barriers are to be relied upon, field permeability tests are necessary.

**In the event that the Class III waste's liquid fraction, or the leachate obtained with distilled water from a dry solid, or from the solid or particulate fraction of a Class III waste, contains concentrations of any component significantly in excess of those naturally occurring concentrations found in the ground water in the vicinity of the disposal site, the Texas Department of Water Resources may recommend ground-water protection measures similar to those for Class II waste.

Recommended soil liner thicknesses may not be reduced for soil materials which are less permeable than $1x10^{-7}$ cm/sec.

Soil material to be compacted for a liner should be placed in lifts not less than six inches nor greater than nine inches in thickness. The soil should be compacted to at least 95% of maximum density at or slightly above optimum water content, as determined by ASTM Standard Method D-698, and then scarified to a minimum depth of two inches prior to placement of the following lift. Selection of an appropriate moisture content may depend on the results of permeability tests conducted using the waste's leachate.

The Texas Department of Water Resources discourages the exclusive use of synthetic membrane liners (PVC, CPE, butyl rubbers, etc.) as permanent barriers at conventional landfill sites due to their unknown long-term durability and their tendency to puncture when subjected to heavy equipment traffic during pushing and compaction activities within the fill area. In the event a synthetic membrane liner is being considered for use at a landfill site, special precautions should be taken to insure that its integrity will be maintained. The Department recommends that synthetic membrane material be at least 30 mils thick, be installed on a properly prepared soil underlining, and be protected by a sufficiently thick soil cover. A leak-detection system may be appropriate when the artificial liner can be repaired or replaced.

Hydrologic Conditions

Whenever possible the bottom of the landfill area should be well above the seasonally high ground-water level. Significant hydraulic connection (surface and subsurface) between the site and standing or flowing surface water should be absent. Each disposal site will be evaluated individually but as a rule, the minimum recommendations in Table II should be met.

TABLE II

Parameter	Waste Classification		
	I	II	III
Subsurface monitoring*	Yes	Yes	-
Leachate collection	Yes	***	-
Depth to seasonally high water level below base of landfill waste containment barrier**	5'	5'	-
Flood protection			
If site is below 100-year floodwater elevation	X	Z	-
If site is above 100-year floodwater elevation	Z	Z	-

X = operator should provide ample surface water diversion dikes with a minimum height equal to two (2) feet above the 100-year floodwater elevation around the perimeter of the disposal site. Facilities in areas subject to flooding by the 100-year hurricane storm surge may need additional freeboard to prevent overtopping by wave action.

Z = operator should provide diversion structures capable of diverting all of the surface water runoff and run-on from a 24-hour, 100-year storm.

*Recommendations for design of subsurface monitoring systems are contained in TDWR Technical Guideline No. 6, "Monitoring Systems and Leachate Collection."

**The suggested values for the depth to the seasonally high water level set forth above may not be appropriate for all variations in landfill design and hydrogeologic setting. Saturated clay and clay shale deposits with shallow ground-water tables such as occur along the Texas Gulf Coast may, if they are sufficiently impermeable, homogeneous, and massive, serve as environmentally acceptable locations with regard to seepage control from landfills. In this regard, it should be documented that the base of the waste containment barrier will be at least five feet above the uppermost, permeable (i.e., hydraulic conductivity $>10^{-5}$ cm/sec) saturated unit.

***May be recommended for some sites and for Class II wastes which have liquid components. Design recommendations are in TDWR Technical Guideline No. 6, "Monitoring Systems and Leachate Collection."

Topography - The landfill site should be located in an area of low relief to minimize erosion and help prevent landslides or slumping. Broad upland flats or divides away from major or tributary drainages are preferred. Fills should not be placed in swales, draws, gullies, valleys, or arroyos. If the only area available is highly dissected, the heads of draws or gullies are preferable over the downstream reaches, but precautions should be taken to prevent headward erosion of the gully into the landfill. Rainwater should not be allowed to accumulate in the upper part of the gully and percolate through the fill into the lower reaches of the surface drainage system. Whenever possible, it is wise to take advantage of natural favorable grade to direct storm-water runoff around the landfill area. In many instances it will be necessary to build dikes, ditches, or other structures to divert runoff around the fill area. Such diversion structures should be capable of handling at least a maximum 24-hr/100-yr rainfall. Ideally, the only water that should ever accumulate in the landfill area is that rainwater which falls directly onto the landfill.

COVERING THE LANDFILL

All landfill areas (except possibly Class III) should have a final cover of compacted relatively impermeable soil placed as soon as that portion of the fill has reached its final elevation. Unless the recommendations for above-grade landfills are met, waste materials should not be placed to levels greater than two (2) feet below the surrounding natural ground surface elevation. The final cover should be progressively applied as operations proceed until the entire landfill area is eventually capped. Hazardous waste landfills have additional final cover requirements beyond those specified here.

Cover material should consist of a well-graded, fine-grained, clay-rich soil, as described in Table I, having good workability and compaction characteristics. If a suitable soil is not available on the site, it will be necessary to haul in the appropriate cover material. The cover is necessary to minimize infiltration of rainwater, development and exfiltration of leachate, vector (insect and rodent) problems, blowing debris and dust, fires, and the release of gas and odors.

The minimum recommended compacted soil thickness of a clay final cover is four (4) feet for Class I or three (3) feet for Class II. Equivalent multilayer cover systems may be designed which require a lesser thickness of clay, although two feet of clay would generally be the minimum recommended thickness of a clay component within such a system.

Cover material should be placed in lifts not less than six (6) inches nor greater than nine (9) inches, compacted to 95% of maximum density at or slightly above optimum water content, as determined by ASTM Standard Method D-698, and scarified to a minimum depth of two (2) inches prior to placement of the following lift. The final cover should be graded to have a crown with slopes between 2% and 5%.

The entire surface of the fill should be covered with a minimum of one (1) foot of uncompacted, fertile topsoil which is stabilized with a self-sustaining vegetative cover or other acceptable material to minimize erosion. If a vegetative cover is used, it should be selected based on climatic conditions and depth of root zone. With the exception of dry climates, the depth of the root zone should be relatively shallow to minimize disruption of the cover. Where runoff becomes concentrated, lined ditches, pipes, or other drainage structures are recommended to minimize erosion of cover material which would increase the potential for exposure of the waste.

Where necessary to prevent air pollution problems, public health hazards (particulates, odors, vectors, etc), and excessive leachate production, intermediate or intermittent cover should be applied to deposited waste. Operators of landfills accepting putrescible, rapidly biodegradable, foul-smelling, volatile, or easily wind blown wastes should cover these wastes with a minimum of six (6) inches of soil daily. Landfills accepting large volumes of "trash" such as paper, wood, plastics, and metal cans which are readily compactable, should have a minimum of six (6) inches of soil applied for every five (5) feet of compacted waste or cover once a week. Some Class II and certain other waste materials which pose no problem would generally require no intermittent cover.

ABOVE-GRADE LANDFILLS

Above-grade landfills differ from below-grade landfills in that wastes are placed above the natural ground surface elevation. Due to this construction, above-grade landfills have an increased potential for erosion loss. The Texas Department of Water Resources recommends a design at least equivalent to the following in order to provide good above-grade waste containment and proper erosion control.

The following specific guidance, as well as the recommendations on landfills in general, should be considered in the design of above-grade facilities.

Class I

All Class I wastes placed above natural grade should be laterally contained by dikes constructed of compacted clay-rich soil as described in Table I. The dikes should be constructed with an exterior slope no steeper than 4:1 (horizontal:vertical), and an interior slope no steeper than 2:1, and have a minimum crest width of at least eight (8) feet. Wastes should be placed no higher than three (3) feet below the dike crest at the outer edge of the waste but could slope up at a maximum slope of 2% to the center of the landfill, provided that no waste is higher than the lowest elevation of the dike crest. The waste material should be capped by a minimum of four (4) feet of compacted clay-rich soil, as described in Table I, or by an equivalent multi-layer cap. The cap should be sloped at a 2% to 5% slope to a crest. The cap and the dikes should be maintained to prevent both ponding and erosion. It may be necessary to use lined conveyance structures to route runoff to the natural grade elevation. All surfaces of the fill should be covered by suitable soil, capable of supporting vegetative growth, which is vegetated to mitigate erosion losses.

If an above-grade landfill is to be placed over an existing below-grade landfill, the predicted effect of this additional weight on the existing liners and leachate collection system due to consolidation should be determined.

Class II

All Class II wastes placed above grade should be contained by dikes constructed of compacted clay-rich soil as described in Table I. The dikes should be constructed with an exterior slope no steeper than 3:1 (horizontal:vertical), and an interior slope no steeper than 2:1, and a minimum crest width of eight (8) feet. Wastes should be at least two (2) feet below the dike crest at the outer edge of the waste, but could slope up to the center of the landfill, provided that the cover is maintained at an adequate thickness with a 2% to 5% surface slope. Cover specifications are the same as for a typical below-grade facility. The cap and the dikes should be maintained to prevent both ponding and erosion. It may be necessary to use lined conveyance structures to route runoff to the natural grade elevation.

Class III

The design should provide means for maintaining placement of the waste and minimizing runoff from and run-on into the facility. Design should be based on site specific conditions.

CLIMATE

If a landfill is located in an area of recurring storms (coastal high hazard areas) its design should provide adequate protection from storm surge, tropical storm rainfall, and wave action during flooding.

Any facility within the 100-year floodplain should be designed so that it does not significantly restrict flood flow, reduce the temporary water storage capacity of the floodplain, or allow washout of solid waste.

Where annual rainfall is high, especially where it exceeds gross evapotranspiration, the leaching potential of a landfill could be high. A calculation of water-balance and infiltration is recommended to show if cover design and leachate collection system design are adequate.

OPERATING METHODS/CONSIDERATIONS

Most literature written on landfills is primarily concerned with the "sanitary landfill." The American Society of Civil Engineers defines a sanitary landfill as: "a method of disposing of refuse on land without creating nuisances or hazards to public health or safety, by utilizing the principles of engineering to confine the refuse to the smallest practical area, to reduce it to the smallest practical volume and to cover it with a layer of earth at the conclusion of each day's operation, or at more frequent intervals as may be necessary." Such a landfill is a well-controlled and truly sanitary method of disposal of solid wastes upon land. It consists of four basic operations: (1) The solid wastes are deposited in a controlled manner in a prepared portion of the site; (2) The solid wastes are spread and compacted in layers; (3) The solid wastes are covered at least daily with a layer of soil; and (4) The cover material is compacted daily.

Although sanitary landfills and associated operating methods are normally thought of as relating only to disposal of municipal refuse or "garbage," large volumes of many kinds of Class II and Class III industrial wastes are being adequately disposed of by utilizing the basic principles of sanitary landfilling. Class I wastes require a "secure landfill" which is designed, constructed, and operated to provide maximum isolation of waste materials from other wastes and from contact with ground water or atmosphere.

However, many of the basic operating practices/procedures for landfills are somewhat independent of the type of waste being disposed of and are suggested for use at all types of landfill operations. Some of these practices are discussed below.

Supervision

A clean, safe, orderly, environmentally sound operation requires constant and competent supervision. It is also important to employ experienced or adequately trained personnel to operate the landfill.

Operating Records

For continuing evaluation and future planning, detailed records should be kept of all incoming material: volume, waste analysis and characterization, and source or origin. It is also important to record accurately the location of final disposal of all Class I wastes buried at the site. More information on recordkeeping is contained in the Texas Department of Water Resources' Technical Guideline No. 8 on "Records."

On-site Roads

The on-site roads to the unloading area should be of all-weather construction. These roads should be maintained in full operating condition at all times and routinely policed for spills.

Treatment or Stabilization of Free Liquids

Wastes which are liquid or semisolid should be mixed with clay-rich soil, cement kiln flue dust, or other effective sorbent prior to their placement in landfills. Granular soil materials are not recommended as sorbents due to the potential for waste mobilization by infiltrating fluids. Sorbents for Class I wastes, either hazardous or non-hazardous, should not be subject to future decomposition.

Compaction

Adequate waste compaction will reduce future settlement and thereby diminish maintenance of the final cover. Wastes should be placed at the top or base of the working face, spread in layers about two (2) feet thick, and compacted. If a slope or ramp is used, better compaction normally will result if the wastes are spread and compacted from the base upwards. The degree of waste compaction achieved is dependent upon the character of the wastes, the weight and type of compaction equipment, and the number of passes the equipment makes over the material.

Working Face

The size of the working face of the landfill is determined somewhat by the rate of unloading of incoming vehicles. The working face should be as narrow as possible to minimize the exposed area, but not so small as to interfere with the unloading operations and the movement of landfill equipment.

Blowing Debris

When landfilling waste materials which are susceptible to being spread by the wind, it is necessary to provide some means of containing this material. The most common method of controlling blowing wastes is with a combination of permanent and portable fences. Unfortunately, under certain wind conditions, debris may blow up and over the fences so that fences do not provide complete control. Prompt compaction and covering of placed wastes and daily gathering of loose debris should be practiced to control windblown wastes.

Wet Weather Operation

Wet weather can seriously hamper the operations of a landfill by making the soil too soft, mucky, or slippery for equipment operation. Wet weather can also seriously interfere with trenching, covering, and general traffic flow to and from the working face. For these reasons, all-weather roads and adequate drainage should be provided. In many cases, it is desirable to provide a temporary wet weather landfill area adjacent to the all-weather road. Such sites are used only during the wet weather periods when the normal working area is not accessible. Free-standing liquids should be removed from the landfill prior to deposition of additional waste materials.

Maintenance

Routine maintenance of all facilities (roads, dikes, ditches, fences, equipment, etc.) at the landfill site is essential to maintain a clean, orderly, safe, and environmentally acceptable operation. All components should be inspected frequently and kept in good condition.

Topic: MONITORING SYSTEMS AND LEACHATE COLLECTION

General

A monitoring program is essential to assess the impact of waste management activities on ground and surface waters in the vicinity of a waste management facility. A monitoring program consists of at least three phases.

The first phase of a monitoring program is to obtain groundwater and surface water samples to establish background conditions. This data provides a standard against which to compare subsequent samples collected in the area. Ideally, samples analyzed for background data should be collected prior to the commencement of waste management activities. Although less desirable, background data collected after operations have commenced can also provide a reference with which to compare the results of subsequent analyses.

The second phase of a monitoring program is periodic sampling of defined sources (e.g., monitor well, leachate collection drainfield, nearby streams, etc.) during the course of waste management operations.

The third phase is periodic sampling of defined sources for a period of time after final closure of the facility.

If monitoring indicates that ground or surface waters have become contaminated, the owner/operator should notify the TDWR and submit a written plan of action detailing procedures to be initiated to determine the source of the contaminants. Once the cause is determined to be a result of facility operations a plan of corrective actions and a schedule for implementation should be submitted to the TDWR Central Office.

There are many techniques for monitoring the migration of contaminants from solid waste facilities. Selection of the appropriate techniques depends on site characteristics, waste characteristics, and methods of waste management. This guideline provides a brief discussion of several methods used to monitor site performance.

I. Ground Water Monitoring

Ground water monitoring beneath the site and the surrounding area requires strategically located wells which provide the capability for determining the source of any contaminants which may be detected. The number of wells is primarily controlled by the size of the facility and the geologic, hydrologic and chemical conditions at the site.

For Class I sites where the underlying earth materials are fairly homogeneous, relatively permeable, and uniformly dipping in one direction, four (one well hydraulically upgradient and three wells hydraulically downgradient) or more sampling points may be necessary. In Figure 1, eight sampling points are equally spaced around the perimeter of the site and one point is placed near the center of the facility.

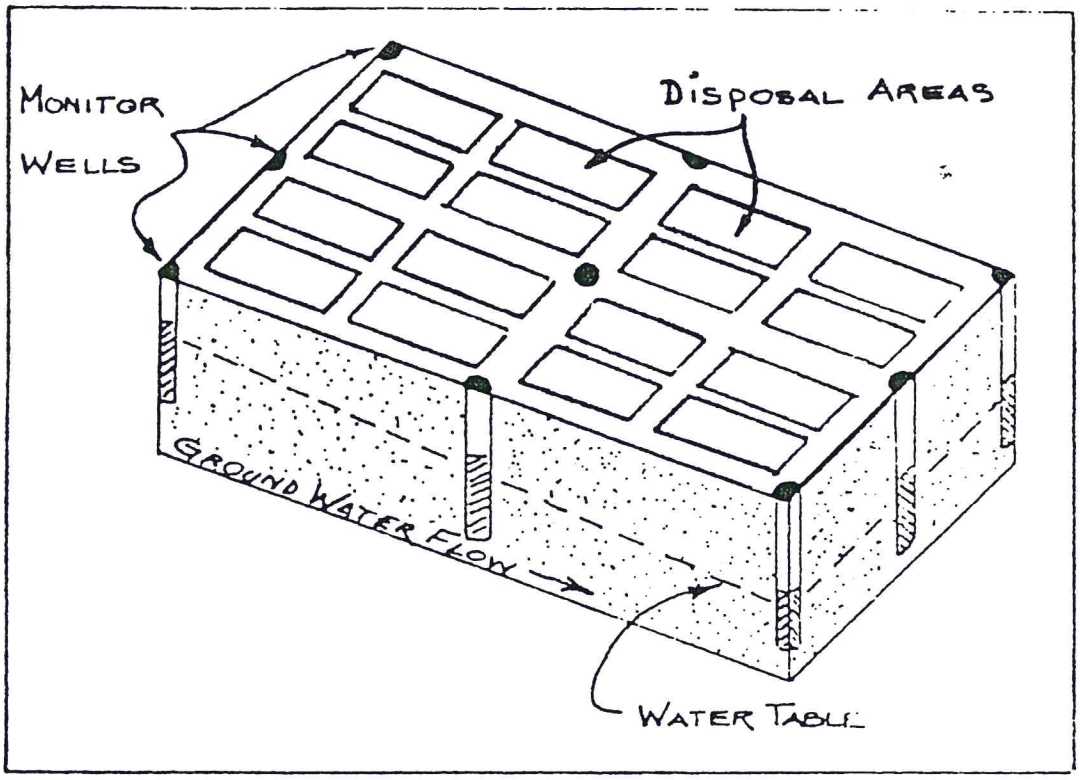


Figure 1.

If ground water flow is uniform throughout the saturated zone such an arrangement should provide sufficient capability for the detection of contaminant migration. However, earth materials are seldom homogeneous. Ground water flow through any given profile may be complex, requiring several wells at different locations and depths for effective ground water monitoring. For example, an impervious stratum may be folded or distorted in such a manner as to locally influence the flow of ground water and the migration of contaminants as illustrated in Figure 2.

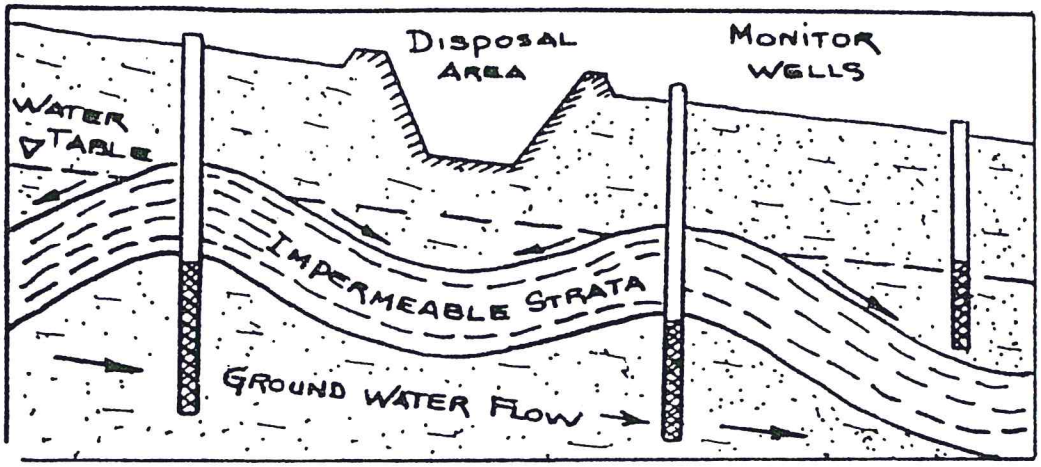


Figure 2.

In many locations several water bearing strata are present. Depending on specific site conditions, monitoring of the upper two water bearing units may be necessary (Figure 3.)

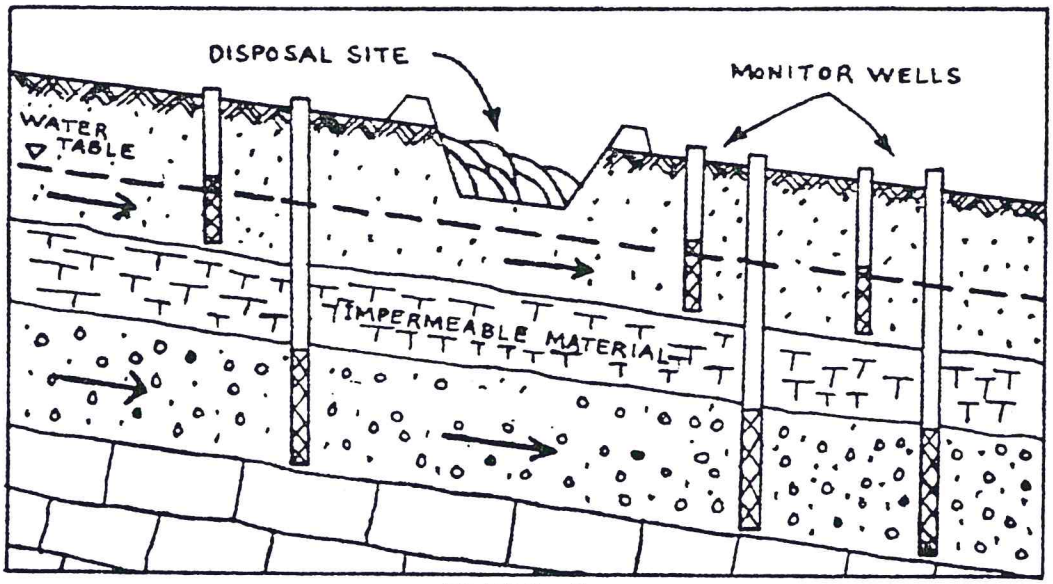


FIGURE 3.

Geologic and hydrologic complexities appear to be the rule rather than the exception. For this reason it is necessary to determine the optimum locations, depths, and number of monitor wells from data gathered during the initial site investigation.

Monitor wells at Class I and Class II sites should be sampled at least monthly for the first year of site operation and quarterly thereafter with the appropriate analyses run on each sample collected. The results of initial sample analyses should be submitted to the Texas Department of Water Resources Central Office. Subsequent sampling data should be kept on file and be available for inspection by TDWR personnel.

All monitor wells should be cased and the annular space between the "monitor zone" (zone of saturation) and the surface should be completely backfilled or plugged with cement or packed clay to effectively prevent percolation of surface water into the well bore. The well opening at the surface should have a removable cap to provide access and to prevent entrance of rainfall or storm-water runoff. Well casing of sufficient diameter to permit use of a submersible pump for obtaining samples for analysis is desirable, but portable pumps may be used to obtain samples. In order to capture low density contaminants which may remain at the top of the saturated zone, well perforations or screen should begin at or slightly above the ground water surface (Figure 4.). When sampling, a measured amount of water equal to or greater than three times the amount of water in the well and/or gravel pack should be removed and discarded prior to collecting a sample for analysis.

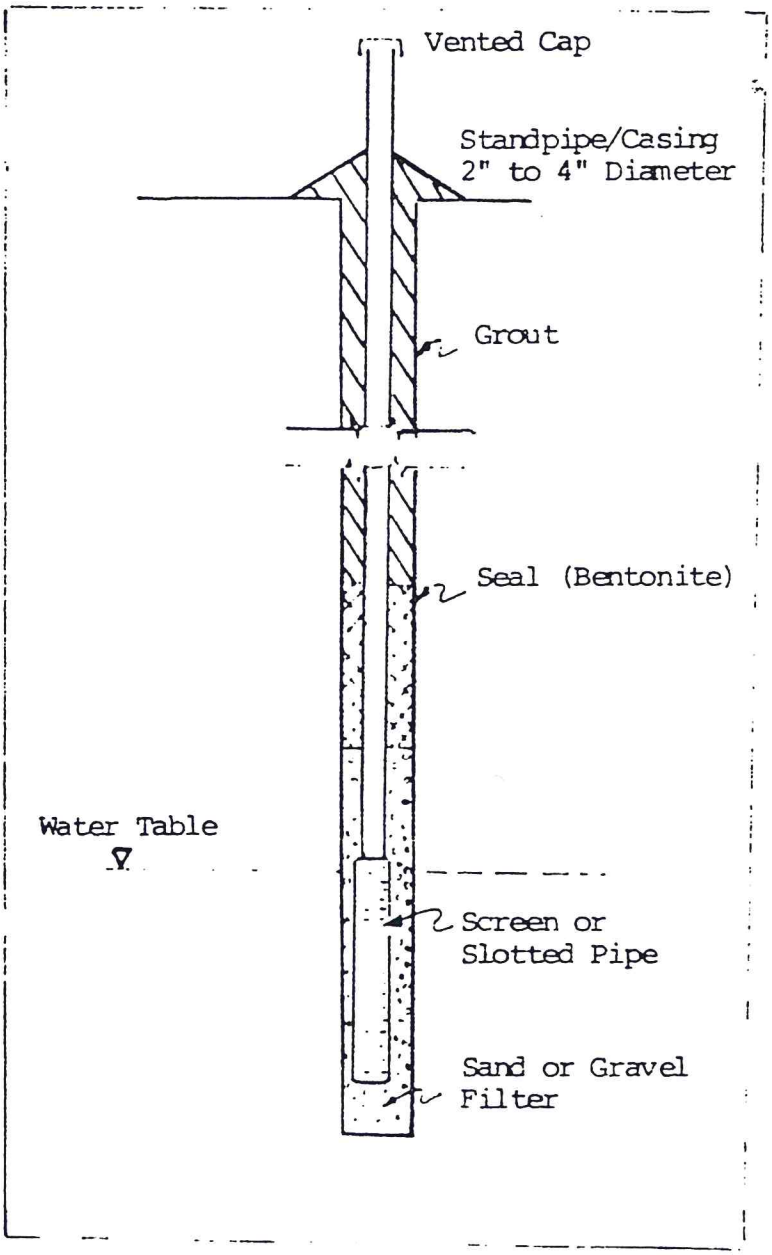


Figure 4.

II. Monitoring The Unsaturated Zone

The unsaturated zone is that part of the soil above the water table. Within this zone the pore spaces are primarily filled with air with varying amounts of water present. Under normal circumstances, contaminated leachate must pass through this unsaturated zone prior to reaching ground water. The value of monitoring the unsaturated zone is in detecting the migration of waste or leachate as early as possible before contaminants enter the ground water.

Monitoring the unsaturated zone requires specialized sampling and analytical techniques which, though more complex than ground water monitoring, may be necessary because of unusual geologic conditions or where extremely toxic materials are present and require very close attention. Monitoring the unsaturated zone may be accomplished through direct sampling and analysis of soils, the extraction and analysis of soil solution, or the measurement of relative changes in soil moisture.

A. Soil Analysis: Soil samples can be collected from the unsaturated zone with an auger or other soil sampling device. Samples should be stored in moisture proof containers and then subjected to the appropriate analyses in the laboratory. In no case should borings penetrate liners that serve as barriers to waste or leachate migration. All boreholes should be backfilled with soil and compacted, or cased and fitted with a water tight cap to prevent rainfall or runoff from entering the borehole and to provide access for future samplings.

B. Soil Moisture Sampling Devices: These instruments are designed to extract moisture from unsaturated or saturated soils. The devices basically consist of a porous ceramic cup which is placed in intimate contact with the soil at the desired sampling depth (Figure 5). A partial vacuum is established on the inside of the cup and the soils solution is drawn by capillary action into the cup where it can be collected via an access tube. Effective soil moisture sampling requires that the device be installed properly and that the soils be relatively moist.

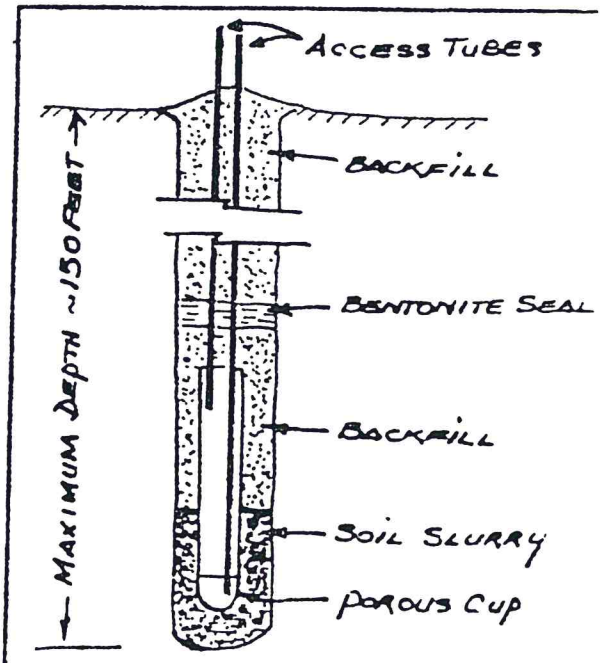


Figure 5.

C. Devices for Measuring Soil Moisture: The migration of waste or leachate through unsaturated soils can often be detected by measuring relative changes in soil moisture content. Several devices are available for determining changes in soil moisture content including tensiometers, gypsum block resistometers, psychrometers, and neutron attenuation devices. Although these instruments may indicate seepage by measuring changes in soil moisture they have no sampling capabilities and therefore can provide no information on the chemical or physical characteristics of the soil fluids.

III. Leachate Monitoring/Collection Systems

A leachate monitoring/collection system should be installed in all landfill facilities accepting hazardous or Class I wastes, any Class II landfill in which ground water is less than six (6) feet from the bottom of the facility, and all Class I and Class II ponds utilizing constructed or artificial liners. Acceptable leachate monitoring/collection systems include, but are not limited to the following basic design:

A. Leachate Collection: This system consists of a gravity flow drainfield installed directly on top of the waste disposal facility liner with a collection sump provided for removal of accumulated liquids. This design is recommended for use in all Class I landfills (Figure 6.)

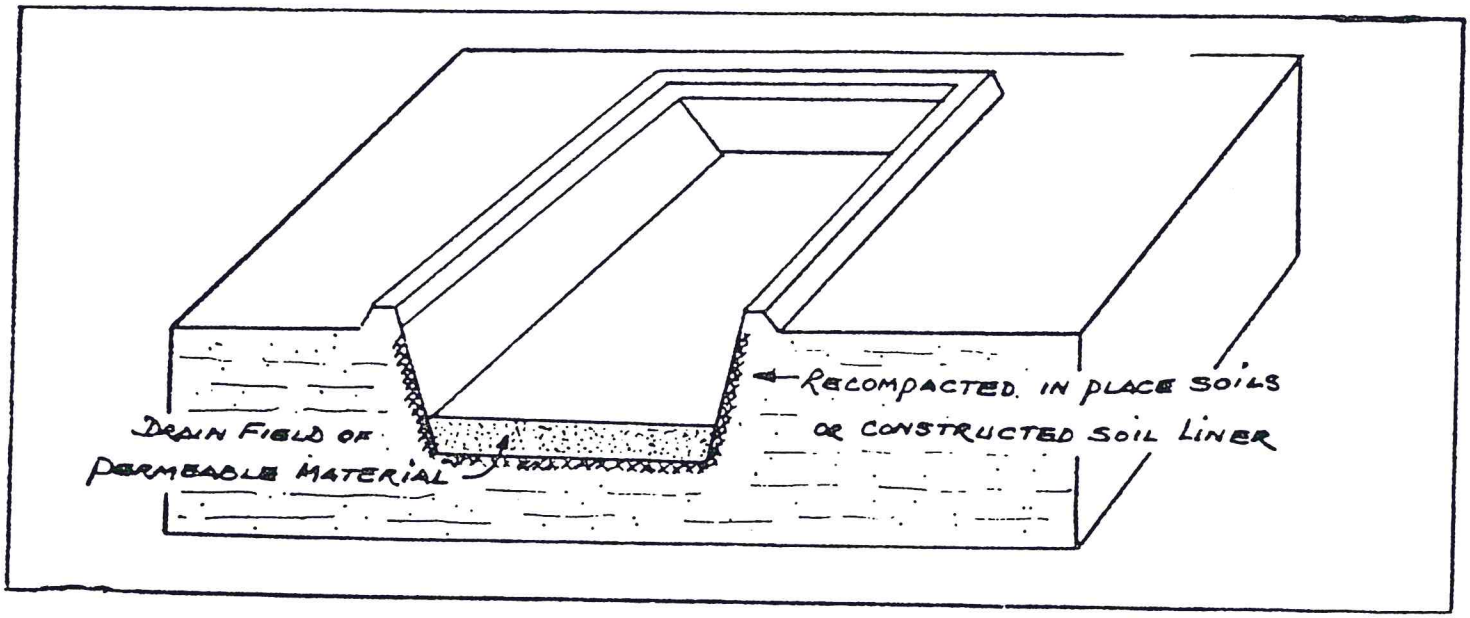


Figure 6.

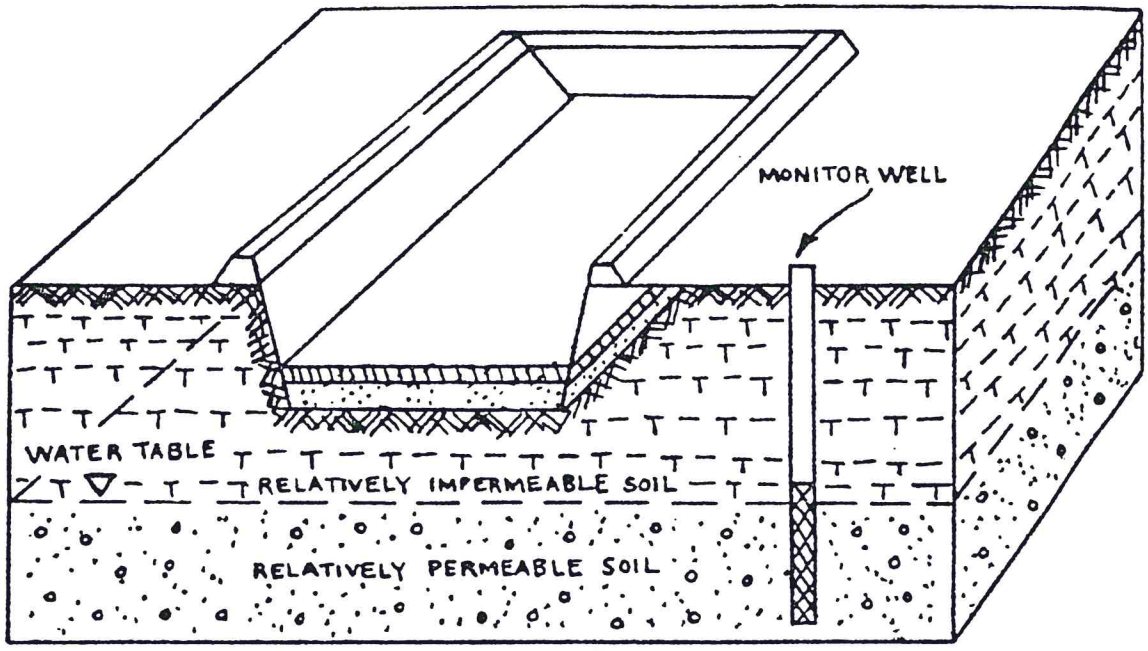


FIGURE 7A

B. Underdrain System: This system consists of a gravity flow drainfield and collection point installed under the waste disposal facility liner and above a secondary liner. Figure 7A represents the situation where the in place soils are of sufficiently low permeability to serve as a secondary liner. Figure 7B represents the situation where a constructed liner must be utilized as the secondary liner due to the permeable nature of the surrounding soil materials. These designs are primarily utilized in liquid holding facilities and are especially recommended for facilities incorporating synthetic liners in their design.

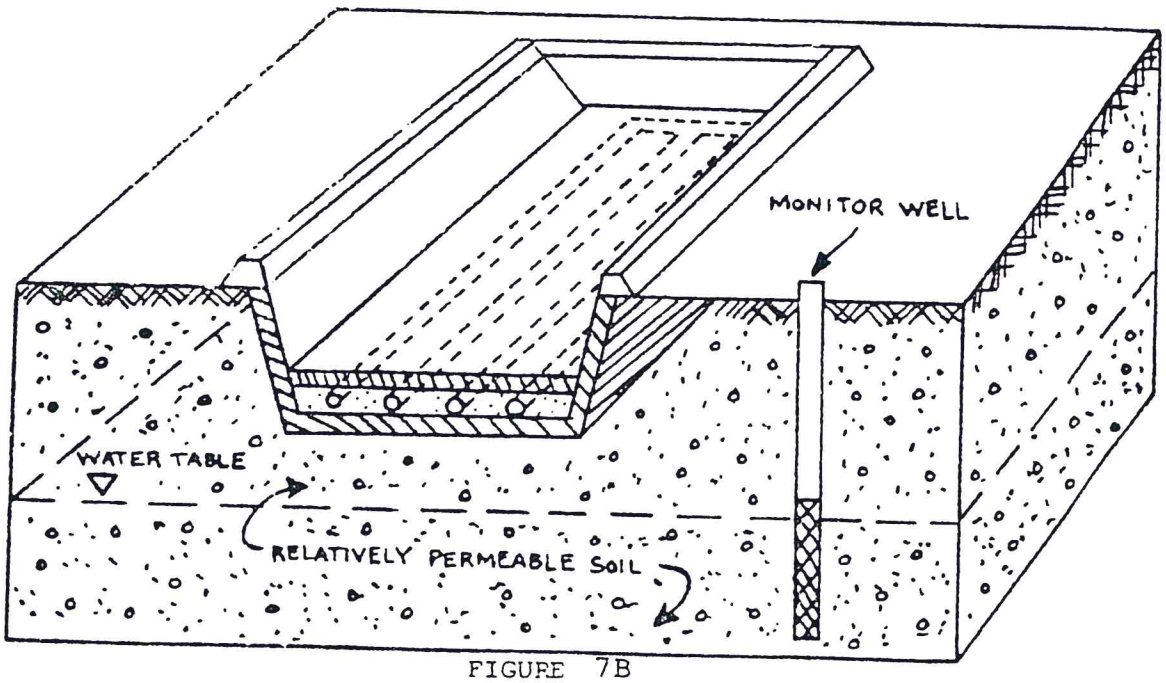


FIGURE 7B

Both leachate collection and underdrain system sumps should be inspected on a routine basis. Accumulated fluids should periodically be collected and disposed of in an acceptable manner.

It is recommended that facilities accepting hazardous or Class I wastes employ both ground-water monitor wells and leachate monitoring/collection systems in order to minimize the potential for uncontrolled discharge of pollutants into the ground or surface waters and to detect the migration of pollutants as rapidly as possible in the event that they escape the disposal facility. Under no circumstances should monitor wells or leachate monitoring/collection systems be used in lieu of an appropriate liner.

UNION CARBIDE CORPORATION
COATINGS MATERIALS DIVISION
Star Route Box 90
Brownsville, Texas 78521

August 1, 1986

Mr. Dwight C. Russell, Head
Facility Unit III, Permits Section
Hazardous & Solid Waste Division
Texas Water Commission
P.O. Box 13087 Capitol Station
Austin, Texas 78711

RE: Brownsville Plant RCRA Closure Package (Revised 8/1/86)
Industrial Solid Waste Registration No. 31108

On June 16, 1986 you issued a technical notice of deficiencies for the "RCRA Closure Package, Brownsville Plant, Union Carbide Corporation" dated November 1, 1985. The enclosed package addresses these deficiencies and replaces the November 1, 1985 package.

As noted in Section 1 of this package, Union Carbide would appreciate an opportunity to discuss with TWC personnel the present and future groundwater requirements associated with the Ball Mill Residue Basin. This meeting would also provide quick resolution of any other TWC concerns associated with the closure plans. We will be contacting Mr. S. G. Huling in the near future to arrange said meeting.

Union Carbide is anxious to initiate the decontamination of the two tank and incinerator areas. Thus, your attention to this package would be greatly appreciated.

Very truly yours,

Belia Cortez

Belia Cortez

cc: Mr. S. G. Huling*, TWC - Austin

bcc: Mr. A. C. Booth, 511
Mr. O. H. Cunningham, K-4, Danbury
Mr. T. T. Elgin*, K-4, Danbury
Mr. R. C. Wise*, K-4, Danbury

* Transmittal letter only

TABLE OF CONTENTS

SECTION I

UNION CARBIDE RESPONSES TO
TWC'S NOTICES OF DEFICIENCIES

BALL MILL RESIDUE BASIN

1. Please indicate in the revised closure plan which EPA-approved test methods were used to analyze the standing liquids, sludge, soil, and ground water.

   Response

   The closure plan has been appropriately revised.

2. Table I in the Notice of Registration lists the EPA Hazardous Waste numbers for each waste number. The EPA Hazardous Waste numbers tabulated in Table I of the Notice of Registration do not correspond to the TWC Sequence Numbers in Table III-1 of the Part A application. Please revise the Part A application to clarify this apparent discrepancy.

   Response

   Following this reply document is the revised Table III-1 of the Part A application.

3. Pursuant to 40 CFR 265.115, both the owner or operator and an independent Registered Professional Engineer must submit certification that the facility has been closed in accordance with the specifications in the approved closure plan. Please include a statement in the revised closure plan that certification will be provided in the final data report for the Ball Mill Residue Basin.

   Response

   The required closure certification has been attached to the closure plan.

4. Presently it is unclear what UCC intends to do with the waste and waste residues remaining in the surface impoundment. Pursuant to 31 Texas Administrative Code (TAC) 335.6(f), the industrial solid waste remaining in-place must be classified in accordance with Technical Guideline No. 1, (copy enclosed). Furthermore, if UCC does not intend to use the surface impoundment in the future and intends to leave industrial solid waste in place, then UCC is required to notify the Agency of the closure activities in accordance with 31 TAC 335.6(g). We feel that inactive surface impoundments containing waste should be closed in accordance with Technical Guideline Nos. 3 and 6 in order to minimize contaminant migration to the ground water. In addition, if UCC intends to operate the surface impoundment for non-hazardous waste, the integrity of the liner in the unit should be assessed prior to commencing placement of non-hazardous waste in the unit. We request that a further review of the planned management activities for the Ball Mill Residue Basin be conducted and a proposed plan and schedule be submitted which incorporates the aforementioned requirements and recommendations. This information should be included in the revised closure plan.

Response

As expressed in the closure plan, UCC does not intend to utilize the basin in the future. UCC has contracted an environmental consulting firm to prepare cost estimates for various physical closure options.

Before developing a physical closure plan for TWC approval, UCC needs guidance on how TWC will address our groundwater situation. This guidance, along with cost estimates from the consultant, will provide the basis for UCC's closure option selection.

UCC requests an informal meeting with your representative, Scott G. Huling, and a representative from the Enforcement Section to discuss closure and groundwater issues.

Attached to this reply document is an "Industrial Solid Waste Reclassification Form" providing information for reclassifying the basin contents, and thus the entire basin, to Class I non-hazardous.

STATUS OF GROUND WATER BENEATH THE BALL MILL RESIDUE BASIN

1. UCC indicated in Section 2 of the closure plan that the waiver agreement does not require UCC to conduct statistical determinations of potential ground-water contamination. However, the letter from the Texas Department of Water Resources to UCC dated July 1, 1982 (submitted as Attachment B in the closure plan) specifies that the annual report should be submitted in accordance with 31 TAC 335.175(b). This regulation adopts by reference the requirements of 31 TAC 335.194(b) which require that statistical determinations be performed on ground-water monitoring data. The closure plan should therefore be revised to include the statistical determinations required by 31 TAC 335.194(b).

   Response

   The statistical analysis have been included. The results show significant increases in pH at wells MW-1 and MW-3 and significant increases in total organic carbon at well MW-1.

2. It appears that the ground-water elevation data submitted as Attachment C in Section 2 of the closure plan indicates MW-1 to be upgradient for years 1982 through 1984, and MW-3 to be slightly upgradient in 1985. The closure plan indicates MW-4 as the upgradient well. Please provide an evaluation of the ground-water monitoring system for this unit which includes a discussion of how the system complies (or fails to comply) with the requirements of 40 CFR Part 265 Subpart F.

   Response

   A more thorough discussion of the monitoring well network has been included. The additional discussion states that the Ball Mill Residue Basin acts as a surcharge point for the immediate area and that the present monitoring system does meet 40 CFR 265 Subpart F performance requirements.

3. Based on the ground-water data submitted as Attachment C, it appears that ground-water contamination may have occurred as indicated by the elevated levels of TOC in monitoring well MW-1. The Hazardous and Solid Waste Enforcement Section has been notified of this matter and their comments will be forthcoming by separate letter. Please be advised that ground-water monitoring in accordance with 40 CFR Part 265 Subpart F must be continued until closure of the Ball Mill Residue Basin has been completed pursuant to an approved closure plan.

Response

This comment and the next one puts UCC in a dilemma. Normally, an indication of significant changes in the indicator parameters (in this case pH and TOC) would trigger automatic resampling/analysis for verification (40 CFR 265.93(c)(2)) followed by initiation of the groundwater quality assessment plan if significant changes are verified (40 CFR 265.93(d)). However, the RCRA closure of the basin has already been certified. Thus, should Union Carbide proceed with implementation of Part 264 or 265 groundwater monitoring requirements? What are the Part 264 requirements for a surface impoundment that has been reclassified Class I non-hazardous?

Thus, UCC requests an informal meeting with your representative, Scott G. Huling, and a representative from the Enforcement Section to discuss groundwater issues.

4. We feel it is important to inform you that recent correspondence from the U.S. Environmental Protection Agency (EPA) has clarified their position on the applicability of 40 CFR Part 264, Subpart F ground-water monitoring requirements to regulated units which close in accordance with the interim status closure requirements (see enclosed correspondence). The correspondence from EPA indicates that "you may be required, depending on the extent of contamination that remains after Part 265 closure, to undertake additional activities at a later date to come into compliance with applicable Part 264 ground-water monitoring and corrective action standards. The final test of whether additional activities will be required is whether the closed unit would have had additional Part 264 ground-water monitoring and corrective action obligations had it closed pursuant to a permit (recall that Section 3005(i) imposes the same Subpart F requirements on interim status units that they would have had if they had been permitted)."

Since the closure plan presently does not propose the removal of all waste and waste residues, there is a strong likelihood that post-closure requirements will be imposed on this facility.

Response

Refer to previous response.

INCINERATOR, TANK 3326, AND TANK 5211 CLOSURE PLAN

Incinerator

a. Please submit a scaled plan-view drawing of the incinerator area and include locations of the proposed soil sampling and the background soil sampling locations. Background soil analysis should be performed in an area unaffected by waste management activities. In addition, the plan-view drawing of the incinerator area should include the areal extent of soil removal in the event soil contamination is identified. Please include on the plan-view drawing the location of the proposed soil samples to verify if additional contaminated soil excavation is necessary.

Response

A drawing showing locations of soil sampling has been included. UCC will use the certifying engineers judgement as to placement of any additional soil sampling and extent of soil removal. The TWC District 11 representative will be given an opportunity to view the operation if, and when, actual excavation is required.

b. The closure plan must be revised to provide for the removal of all waste residues from the incinerator, regardless of the waste classification of the residue. This requires that the incinerator stack, pipes, pumps, and all appurtenances be decontaminated. At the end of the cleaning operation, the wash water should be analyzed for formic acid to verify that decontamination is complete. The analysis of the wash water should be included in the final data report. Please provide for a visual inspection that all waste has been removed as well as a sampling and analysis plan which will verify that decontamination is complete.

Response

An alternate residue analysis/removal/decontamination procedure has been included in the closure plan. This approach was discussed between Tim Wippold (ERT, Inc.) and Scott Huling (TWC). UCC believes that this procedure should adequately address TWC's contaminated rainwater concerns.

c. The District 11 Field Office should be notified in writing at least 10 days prior to the commencement of the proposed closure activities. In the event that analysis of soils indicate contamination, the District 11 Field Office should be notified and informed of the proposed excavation procedures. The revised closure plan should include these modifications.

Response

These requirements have been included in this closure plan and the two tank closure plans.

d. The closure plan should be revised to include the EPA-approved test methods which will be used in the proposed analysis.

Response

All test methods for the proposed analyses have been included in the closure plan. The two tank closure plans also include this information.

e. One background soil sample is not adequate to establish background pH, metal, and TOC concentrations. It is our position that at least four background soil samples in an area unaffected by waste management activities should be used to establish background. Please note that the concentration of each of the parameters analyzed for in the soil samples surrounding the incinerator must be less than or equal to the mean of the background samples plus two standard deviations in order to be considered decontaminated.

Response

These requirements have been included in this closure plan and in the two tank closure plans.

f. The analysis should include those metals listed in Table I of 40 CFR 261.24 which are reasonably expected to have been in the waste stream incinerated at this unit. Please indicate in the revised closure plan which metals will be analyzed.

Response

As noted in the Facility Description section of the closure plan, the chromium concentration in the liquid wastes caused the wastes to be classified hazardous (D007). No other metals were expected in the wastes. Thus, UCC proposes to analyze for chromium only. This is also true for the two tank closure plans.

g. Please include a statement in the revised closure plan that any contaminated soil, as determined by visual inspection, will be removed and properly disposed.

Response

This requirement has been included in this closure plan and for the two tank closure plans.

Tank 3326:

a. To verify that the tank has been properly cleaned, samples of the final wash water should be collected and analyzed for formic acid and chromium. These data should be submitted with the closure certification.

Response

To verify that the tank has been properly cleaned, a sample from the final batch of wash water will be analyzed for formic acid, chromium, pH and flash point.

Tank 5211

a. Please indicate how UCC intends to determine if additional cleaning of Tank No. 5211 is needed. In addition, please verify decontamination by the method outlined for Tank 3326.

Response

The tank will be treated as though it has not been adequately cleaned. Decontamination verification is the same as for Tank 3326.

b. Table I of the closure schedule indicates that by day 59, the incinerator will be inspected and certified. Please modify the schedule to indicate that Tank 5211 will be inspected and certified.

Response

All references to the incinerator have been changed to Tank 5211.

OTHER

a. The final report submitted with the certification should summarize all aforementioned sampling and analysis data and procedures. Please indicate in the revised closure plan that UCC will submit all data generated during closure .

Response

All closure plans have been revised to state that the results of all sampling and analysis will be presented in reports submitted at time of closure certifications.

b. Pursuant to 31 TAC 335.5(b), proof of recordation is required prior to instituting disposal operations. If it is UCC's intention to dispose of waste at this facility, UCC should submit proof of recordation with the closure certification.

Response

Attached to this reply document is the current Cameron County deed records pertaining to the Ball Mill Residue Basin. Due to the poor quality of Volume 1096, Pages 292-293, an extra copy of these two pages from plant files are attached.

On July 11, 1986, Union Carbide sent a letter to the Texas Water Commission supplying information (mailing address; contact person; unit status) to revise the current Notice of Registration records. As soon as Union Carbide receives a copy of the revised Notice of Registration, the county deed records will be updated and two copies of the updated records will be sent to the Texas Water Commission per 31 TAC 335.5(b).

ACB/sls
4260E

Table III-I Hazardous Wastes and Management Activities

Verbal Description of Waste	TDWR Sequence Number	TDWR Waste Code Number	EPA Hazard Code	EPA Hazardous Waste No.	Waste Management Activities (Check applicable items) Off-Site Disposal	On-Site Storage[1]	On-Site Processing[2]	On-Site Disposal	Annual Quantity Generated (lbs)	SIC Code and Process
Insulation containing ~20% Asbestos	6	179390	NA	NA	*				200[(1)] Cu. Yd.	2869--Organic Acid Manuuf.
Ball Mill Residues	1	949390	I,C,E	D001, D002, D007			*		50,000	"
Off Spec. Formic Acid	2	911840	C,T	U123			*		1,250,000	"
Misc. Non-Chlorinated Flammable Liquids	2	911840	I,C,E	D001, D002, D007			*		2,000,000	"
Sodium Hydroxide Solution (~20%)	7	900120	C,E	D002, D007	*		*		200,000	"
Solids from Tanks and Production Vessels	8	949550	E	D007	*		*		2,000	"

"Storage" means the holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, or stored elsewhere.

"Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including th treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such wast or so as to recover energy or material from the waste or so as to render such waste non-hazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transportin solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environmen the definition of "processing" does not include activities relating to those materials exempted by the Administrator of the EPA pursuant to the federal Solid Waste Disposal Act, a amended by the Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq., as amended.

(1) The insulation is water soaked making a weight determination unrealistic.

TEXAS WATER COMMISSION
INDUSTRIAL SOLID WASTE RECLASSIFICATION FORM

Submitted by: Union Carbide Corporation

TWC Solid Waste Registration Number: 31108

All tests must be performed in accordance with accepted standard methods. If an unapproved method is used, submit adequate information justifying the use of the method. Please attach copies of all laboratory reports.

Please fill in ALL spaces. If not applicable, explain why.

From TWC Notice of Registration, under Section I: "Wastes Generated":

Ball Mill Residue Basin Material (Facility No. 01), (new waste)
description of waste — code number

1. **Give a complete description of the waste along with a listing of primary constituents. AVOID BRAND NAMES.**

This petition is to reclassify the wastes contained in the inactive Ball Mill Residue Basin from Class I hazardous to Class I non-hazardous. Attachment A lists the wastes that were placed in the basin. Analytical data exists for the Ball Mill residues, sodium hydroxide solution and the combined streams of the carbon deposits and the evaporator scale. No data exists for the waste treatment residue of the bioecology treatment process. The Ball Mill residues contain about 80% acetic acid, has pH ranging from 0.25 to 2.3, flash point ranging from 110°F to 130°F, and chromium concentration ranging from 36 to 470 ppm. The sodium hydroxide solution contains 16% sodium hydroxide solution and 1% gluconic acid, a pH of 13.77 and a chromium concentration of 350 ppm. The combined stream of evaporator (SEE ATTACHED PAGE)

2. **Physical State:** a) solid ☐; liquid ☐; gas ☐; sludge ☒: No Data % solids

b) acidic ☐; caustic ☒: pH 9.14 (average)

c) Organic ☐: ___ %; inorganic ☐: ___ %

See Appendices A and B for analyses of sludge and water.

3. **Describe the process that produces this waste.**

The Ball Mill Residue Basin received wastes primarily from the Ball Mill. The Ball Mill received feed normally from the Acetic Anhydride Concentrating Column tails and the Ball Mill feed tanks and removed the last remaining anhydride from the heavy residues in the feed. The residues of the Ball Mill were removed on a periodic basis and placed in the Ball Mill Residue Basin. Caustic (sodium hydroxide) water was used for process equipment clean-up. The spent caustic solution was sent to the Ball Mill Residue Basin.

Continued from Page 1, Question 1:

scale and carbon deposits contained non-detectable quantities of metals. The analytical data for the sludge and overlying water that are currently contained in the basin are shown in Appendices A and B, respectively.

Attachment A

Description of Waste	Code Number	EPA Hazardous Waste Nos.
Ball Mill Residues (20% PO4 and 80% H_2O)	949390	D001, D002, D007
Carbon Deposits from Firebox	271590	--
Evaporator Scale	171600	--
Sodium Hydroxide Solution	900120	D002, D007
Waste Treatment Residue Bioecology Treatment Process	949550	D007

4. Quantitative analysis for the constituents which could reasonably be expected to be present in the waste due to the process or processes from which the waste was generated.

As described in Part 1, chromium is the one EP Tox metal that could potentially be in the sludge or the overlying water above the maximum concentration due to the processes that produced the influent wastes. However, analytical data for the sludge and water shows chromium to be in quantities below the EP Tox chromium maximum concentration of 5 ppm.

5. Describe any on-site treatment that may affect the classification of this waste.

Treatment of the influent wastes has been achieved by the mixing of the five waste streams. The pH has been brought to a slightly basic level by the combination of acidic and caustic waste streams. Ignitability has been eliminated by the dilution of waste streams of low flash point with waste streams of a higher flash point. The liquid phase/leachable chromium content of the water and sludge has been dramatically reduced as an off-shoot of the waste mixing (probably due to shift in chemical state of chromium caused by pH adjustment).

6. Waste Analysis:

a) EP Toxicity (see 40 CFR Part 261.24)

Parameter	mg/liter	EPA Limit mg/liter	Parameter	mg/liter	EPA Limit mg/liter
Arsenic	_____	5.0	Endrin	_____	.02
Barium	_____	100.0	Lindane	_____	0.4
Cadmium	_____	1.0	Methoxychlor	_____	10.0
Chromium	_____	5.0	Toxaphene	_____	0.5
Lead	_____	5.0	2, 4-D	_____	10.0
Mercury	_____	0.2	2, 4, 5-TP Silvex	_____	1.0
Selenium	_____	1.0	Other*	_____	
Silver	_____	5.0		_____	

See Attachment B

*(leachate data on constituents found in significant concentrations in the waste itself).

Attachment B

Parameter	Sludge	Water
Arsenic	ND	ND
Barium	ND	ND
Cadmium	ND	ND
Chromium	ND	2.95 - 3.21
Lead	ND	ND
Mercury	ND	ND
Selenium	ND	ND
Silver	ND	ND

All Concentrations in ppm.

ND--Not Detected.

Note: The insecticides/herbicides were not analyzed since they have not been used at the Brownsville Plant.

b) **For reclassification to Class III: Leachate (and/or liquid portion) data on constituents found in significant concentration in the waste, including U. S. EPA drinking water standards parameters (see Technical Guideline #1 - Waste Evaluation/Classification).**

This petition does not request reclassification to a Class III waste.

7. a) Oral LD50 (rat) — No Data mg/kg
   b) Ignitability of sludge/water — >210°F
   c) Corrosivity of sludge/water — pH 8.89 to 9.49
   d) Reactivity

8. Please attach any additional information pertaining to any of the following:

   a) Carcinogenicity
   b) Mutagenicity
   c) Teratogenicity — N/A
   d) Bioaccumulative nature
   e) Persistence

9. Sampling: Describe the sampling procedures used and sample preservation and handling methods.

The sludge and water samples from the Ball Mall Residue Basin were collected with a stoppered PVC pipe or by immersing a jar in the sludge or water. The samples were then labeled and shipped for analysis. No special preservation procedures were required due to the waste characteristics which were being analyzed for.

I certify that the information herein is complete and accurate to the best of my knowledge.

Alan C. Booth, 7/21/86
(Signature) (date)

APPENDIX A

Analysis of Sludge Samples

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

r Environmental Research & Technology, Inc.
12012 Wickchester, Suite 200
dress Houston, Tx. 77079

nple marked Sludge Sample SLSB-1

ceived August 1, 1985 Lab No. 93080

Oil & Grease	1.56%

RESPECTFULLY SUBMITTED,

nless otherwise stated, sample as submitted by Client

PAN AMERICAN LABORATORIES

Mary Lee

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.
12012 Wickchester Suite 200
Address Houston, Tx. 77079

Sample marked Sludge Sample SLSB-1

Received August 1, 1985 Lab No. 93080

pH	9.36
Total Organic Carbon	10,550 ppm
Flash Point (PM)	Greater Than 210°
Moisture	25.0%

EP Toxicity

Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	ND LD 0.2 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
ND=Limit of Detection

RESPECTFULLY SUBMITTED,

Unless otherwise stated, sample was submitted by Client

PAN AMERICAN LABORATORIES

Mary Lee

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831 4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.

Address 12012 Wickchester Suite 200
Houston, Tx. 77079

Sample marked Sludge Sample SLSB-2

Received August 1, 1985 Lab No. 93081

pH	9.22
Total Organic Carbon	17,340 ppm
Flash Point (PM)	Greater Than 210°F
Moisture	58.2%
EP Toxicity	
Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	ND LD 0.2 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
ND=Limit of Detection

nless otherwise stated, sample
as submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

For Environmental Research & Technology, Inc.

Address 12012 Wickchester, Suite 200
Houston, Tx. 77079

Sample marked Sludge Sample SLSB-2

Received August 1, 1985 Lab No. 93081

Oil & Grease	10.85%

Unless otherwise stated, sample
was submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831 4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

ess Environmental Research & Technology, Inc.
12012 Wickchester, Suite 200
Houston, Tx. 77079

le marked Sludge Sample SLSB-3

ved August 1, 1985 Lab No. 93082

Oil & Grease	0.72%

otherwise stated, sample
mitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES
Mary Lives

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.
Address 12012 Wickchester Suite 200
Houston, Tx. 77079

Sample marked Sludge Sample SLSB-3

Received August 1, 1985 Lab No. 93082

pH	8.89
Total Organic Carbon	19,600 ppm
Flash Point (PM)	Greater Than 210°F
Moisture	67.9%
EP Toxicity	
Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	ND LD 0.2 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
ND=Limit of Detection

Unless otherwise stated, sample
was submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES
Mary Lives

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831 4266 or 831 4245

CERTIFICATE OF ANALYSIS

August 27, 1985

lress Environmental Research & Technology, Inc.
12012 Wickchester, Suite 200
Houston, Tx. 77079

ple marked Sludge Sample SLSB-4

eived August 1, 1985 Lab No. 93083

Oil & Grease	2.45%

ess otherwise stated, sample submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES
Mary Lippe

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831 4266 or 831 4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.
Address 12012 Wickchester Suite 200
Houston, Tx. 77079

Sample marked Sludge Sample SLSB-4

Received August 1, 1985 Lab No. 93083

pH	9.10
Total Organic Carbon	13,570 ppm
Flash Point (PM)	Greater Than 210°F
Moisture	27.3%
EP Toxicity	
Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	ND LD 0.2 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
ND=Limit of Detection

Unless otherwise stated, sample was submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES
Mary Lippe

APPENDIX B

Analysis of Water Samples

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

For Environmental Research & Technology, Inc.
Address 12012 Wickchester, Suite 200
Houston, Tx. 77079

Sample marked Water Sample WSB-1

Received August 1, 1985 Lab No 93076

Flashpoint Greater Than 230°F

Unless otherwise stated, sample was submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES
Mary Lipps

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.
Address 12012 Wickchester Suite 200
Houston, Tx. 77079

Sample marked Water Sample WSB-1

Received August 1, 1985 Lab No. 93076

pH	9.49
Total Organic Carbon	2,375 ppm
Oil & Grease	118 ppm

EP Toxicity

Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	3.15 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND-Not Detected
LD-Limit of Detection

NOTE: Analysis for Total Organic Carbon contracted to outside Laboratory.

Unless otherwise stated, sample was submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES
Mary Lipps

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

For: Environmental Research & Technology, Inc.
Address: 12012 Wickchester, Suite 200
Houston, Tx. 77079

Sample marked: Water Sample WSB-2

Received: August 1, 1985 Lab No: 93077

Flashpoint Greater Than 230°F

RESPECTFULLY SUBMITTED,

PAN AMERICAN LABORATORIES

Mary Lipps

Unless otherwise stated, sample was submitted by Client

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For: Environmental Research & Technology, Inc.
Address: 12012 Wickchester Suite 200
Houston, Tx. 77079

Sample marked: Water Sample WSB-2

Received: August 1, 1985 Lab No. 93077

pH	9.49
Total Organic Carbon	2,170 ppm
Oil & Grease	288 ppm
EP Toxicity	
Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	3.21 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
LD=Limit of Detection

NOTE: Analysis for Total Organic Carbon contracted to outside Laboratory.

RESPECTFULLY SUBMITTED,

PAN AMERICAN LABORATORIES

Mary Lipps

Unless otherwise stated, sample was submitted by Client

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831 4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

or Environmental Research & Technology, Inc.
ddress 12012 Wickchester, Suite 200
Houston, Tx. 77079

mple marked Water Sample WSB-3

ceived August 1, 1985 Lab No 93078

Flashpoint Greater Than 230°F

nless otherwise stated, sample as submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORIES

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.
12012 Wickchester Suite 200
Address Houston, Tx. 77079

Sample marked Water Sample WSB-3

Received August 1, 1985 Lab No. 93078

pH	9.48
Total Organic Carbon	2,315 ppm
Oil & Grease	188 ppm

EP Toxicity

Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	3.14 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
LD=Limit of Detection

NOTE: Analysis for Total Organic Carbon contracted to outside Laboratory.

Unless otherwise stated, sample was submitted by Client

RESPECTFULLY SUBMITTED,
PAN AMERICAN LABORATORI

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 27, 1985

For Environmental Research & Technology, Inc.
Address 12012 Wickchester, Suite 200
Houston, Tx. 77079

Sample marked Water Sample WSB-4

Received August 1, 1985 Lab No 93079

Flashpoint Greater Than 230°F

RESPECTFULLY SUBMITTED,

PAN AMERICAN LABORATORIES

Mary Lipps

Unless otherwise stated, sample was submitted by Client

pan american laboratories, inc.
Analytical and Consulting Chemists
5369 East 14th Street Brownsville, Texas 78521 (512) 831-4266 or 831-4245

CERTIFICATE OF ANALYSIS

August 22, 1985

For Environmental Research & Technology, Inc.
Address 12012 Wickchester Suite 200
Houston, Tx. 77079

Sample marked Water Sample WSB-4

Received August 1, 1985 Lab No. 93079

pH	9.48
Total Organic Carbon	3,627 ppm
Oil & Grease	8,572 ppm

EP Toxicity

Selenium as Se	ND LD 0.1 ppm
Silver as Ag	ND LD 0.1 ppm
Arsenic as As	ND LD 0.1 ppm
Barium as Ba	ND LD 5 ppm
Cadmium as Cd	ND LD 0.05 ppm
Chromium as Cr	2.95 ppm
Lead as Pb	ND LD 1 ppm
Mercury as Hg	ND LD 0.002 ppm

ND=Not Detected
LD=Limit of Detection

NOTE: Analysis for Total Organic Carbon contracted to outside Laboratory.

RESPECTFULLY SUBMITTED,

PAN AMERICAN LABORATORIES

Mary Lipps

Unless otherwise stated, sample was submitted by Client

DEED RECORDS

VOL 1096 PAGE 287

21674

THE STATE OF TEXAS §
:
COUNTY OF CAMERON §

Industrial Solid Waste Disposal Pit

TWQB Registration Number 31108

Location of Solid Waste Disposal Pit on the premises of Union Carbide Corporation's Brownsville Plant, State Highway 48, Brownsville, Texas, is as follows:

Southwest corner of pit is located 3,625 feet north and 825 feet west of the Southeast Corner Marker of the Union Carbide Corporation Leased Tract described in File No. 1327, Secretary's office, Brownsville Navigation District of Cameron County, State of Texas. Boundary of Pit extends due north of the Southwest corner for 250 feet, thence due east for 150 feet, thence due south for 250 feet, and thence due west for 150 feet and to the point of beginning.

(Seal)

C. M. Partridge

C. M. Partridge, P.E.
Reg. No. 33809

SWORN TO AND SUBSCRIBED before me, the undersigned authority, this the 28th day of September, 1977.

Muriel R. Reyna

Notary Public
Cameron County, Texas
Muriel R. Reyna
My commission expires 2-28-79

VOL 1096 PAGE 288

NOTICE OF REGISTRATION

Industrial Solid Waste Generation/Disposal

This is not a permit and does not constitute authorization of any disposal facilities listed below. Requirements for solid waste management are provided by TWQB Order 75-1125-1.

REGISTRATION NUMBER 31108 (supersedes Registration Number N/A)

This number is to provide access to stored information pertaining to your operation. Please refer to this number in any correspondence or reports.

Company Name: Union Carbide Corp. - Turning Basin
Mailing Address: P. O. Box 3370, Brownsville, TX 78520
Site Location: Northeast of the City of Brownsville on State Highway 48, Texas
Person in Charge: L. T. Windel, Department Head Phone: 512/831-4501
TWQB District: 11 No. of Employees: >100

I. WASTES GENERATED

WASTES GENERATED	CLASS	CODE	DISPOSITION
1. Ball mill residues (20% PO_4 and 80% water)	I	149390	On-site(Landfill)
2. Waste acid mixture containing acetic, formic, propionic, and butyric acid	I	111840	Recycled
3. Boiler carbon deposits	II	271590	On-site(Landfill)
4. Evaporator scale	I	171600	On-site(Landfill)
5. Waste paper and scrap lumber	II	280240	Off-site

II. SHIPPING/REPORTING Under Chapter 4, TWQB Order 75-1125-1, issuance of shipping-control tickets and monthly reporting are required for off-site disposal of the Class I wastes listed in Part I. The first Shipment Summary Report should be submitted for the month of no later than . Forms and instructions are enclosed for the following wastes now being shipped:

Not Applicable

III. ON-SITE DISPOSAL FACILITIES

1. Landfill for the disposal of waste nos. 1, 3 and 4.

The above identified facility is on property owned and/or effectively controlled by Union Carbide Corp., northeast of Brownsville on State Highway 48, Cameron County, Texas in the watershed of Segment 2494 of the Nueces-Rio Grande Coastal Basin.

IV. RECORDS

A. For purposes of filing annual disposal reports pursuant to Section 4.03 B. of TWQB Order 75-1125-1, records should be maintained for disposal of the following waste(s) listed in Part I:

1.	149390	Ball mill residues
3.	271590	Boiler carbon deposits
4.	171600	Evaporator scale
5.	280240	Waste paper and scrap lumber

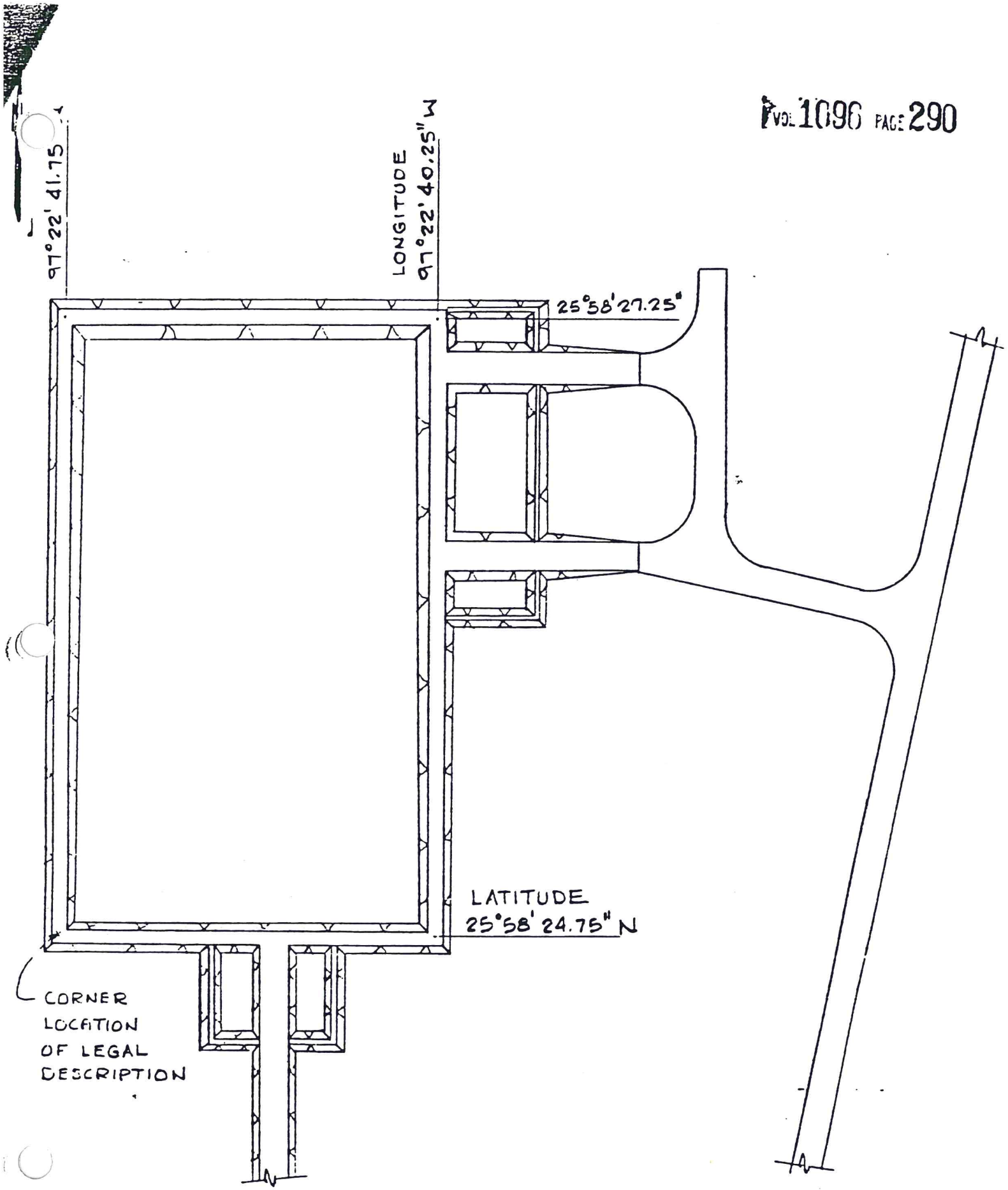
B. Proof of recordation in the county deed records as required by Section 1.05, TWQB Order 75-1125-1, should be submitted to the Texas Water Quality Board no later than October 10, 1977 for the following disposal facilities as listed in Part III:

1. Landfill

MBH/scg

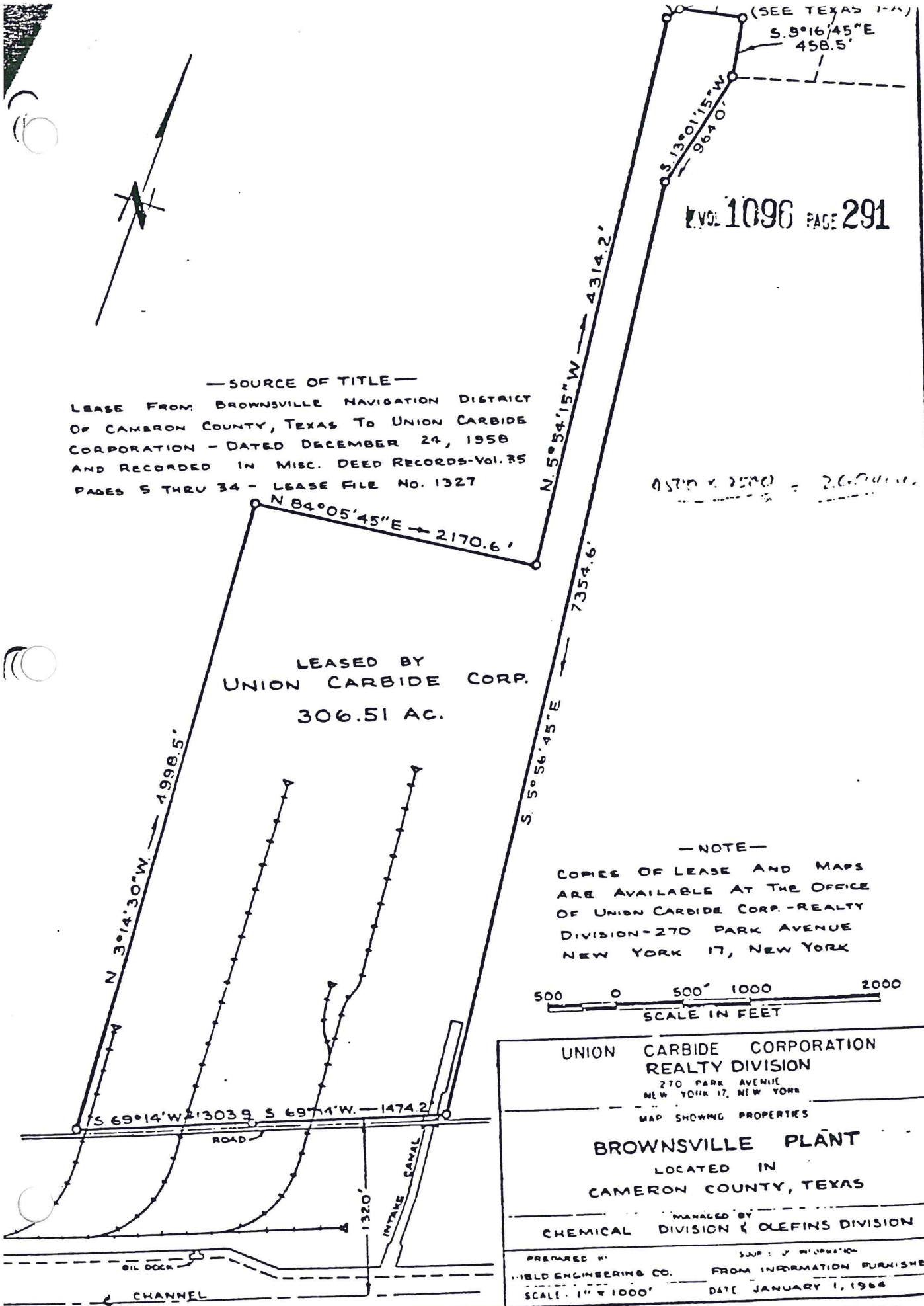
DATE August 10, 1977

VOL 1096 PAGE 290



SOLID WASTE DISPOSAL PIT

UNION CARBIDE CORPORATION
BROWNSVILLE TEXAS PLANT



—SOURCE OF TITLE—

LEASE FROM BROWNSVILLE NAVIGATION DISTRICT OF CAMERON COUNTY, TEXAS TO UNION CARBIDE CORPORATION - DATED DECEMBER 24, 1958 AND RECORDED IN MISC. DEED RECORDS-VOL. 35 PAGES 5 THRU 34 - LEASE FILE NO. 1327

—NOTE—

COPIES OF LEASE AND MAPS ARE AVAILABLE AT THE OFFICE OF UNION CARBIDE CORP.-REALTY DIVISION-270 PARK AVENUE NEW YORK 17, NEW YORK

500 0 500' 1000 2000
SCALE IN FEET

UNION CARBIDE CORPORATION
REALTY DIVISION
270 PARK AVENUE
NEW YORK 17, NEW YORK

MAP SHOWING PROPERTIES

BROWNSVILLE PLANT

LOCATED IN
CAMERON COUNTY, TEXAS

MANAGED BY
CHEMICAL DIVISION & OLEFINS DIVISION

PREPARED BY
HIBLD ENGINEERING CO.
SCALE: 1" = 1000'

SURVEY INFORMATION FURNISHED FROM INFORMATION FURNISHED
DATE JANUARY 1, 1964

TEXAS-7

Lease 97-22-SS

ORIGINAL DIM

VOL 1096 PAGE 292

Brownsville Navigation District
of Cameron County, Texas
SECRETARY'S OFFICE
File No. 4322

THE STATE OF TEXAS §
§
COUNTY OF CAMERON §

FILE COPY

THIS CONTRACT AND AGREEMENT this day entered into by and between the BROWNSVILLE NAVIGATION DISTRICT OF CAMERON COUNTY, TEXAS, a navigation district organized, created, and existing under and by virtue of the laws of the State of Texas and an agency of the State of Texas, with its domicile in Brownsville, Cameron County, Texas, hereinafter styled "District", authorized under and by virtue of the provisions of Section 28 of Article 8263a of Vernon's Annotated Revised Civil Statutes of the State of Texas, Revision of 1925, to lease lands to any individual or corporation and charge therefor reasonable rental, fees or other charges, and UNION CARBIDE CORPORATION, a private corporation organized, created and existing under and by virtue of the laws of the State of New York, with its principal office in New York City, hereinafter styled "Lessee",

WITNESSETH:

The said District does by these presents lease and demise unto the said lessee all that certain tract containing 306.51 acres, more or less, of which 148.97 acres are out of Share 32 of the Espiritu Santo Grant in Cameron County, Texas, and 157.54 acres are out of Share 7 of the San Martin Grant in said County, and being more particularly described as follows, to-wit:

All that certain tract, piece or parcel of land comprising 148.97 acres out of Share 32, Espiritu Santo Grant and 157.54 acres out of Share 7, San Martin Grant, for a total of 306.51 acres in Cameron County, Texas, and more particularly described as follows:

ORIGINAL DIM

BEGINNING at a 2-inch iron pipe located at the intersection of the north rightof-way line of the Brownsville Navigation District and the eastern shore of Port Isabel Shoal 32, Espiritu Santo Grant and Shoal 7, San Martin Grant and the pipe being 1,197 feet off the centerline of the Brownsville Ship Channel;

THENCE South 0° 14' West, 1,333.5 feet to an iron pin for the Southeast corner of this tract;

THENCE North 89° 14' 30" West, 4,000.5 feet to an iron pin for the Southwest corner of this tract;

THENCE North 84° 09' 45" East, 5,810.6 feet to an iron pipe;

THENCE North 5° 56' 15" West, 4,934.9 feet to an iron pipe on the north rightofway line of Cameron County Drainage District No. 1 for a Northwest corner;

THENCE along the south side of said drainage ditch, North 39° 01' East, 123.6 feet to an iron pipe;

THENCE North 79° 21' East, 473.3 feet to an iron pipe;

THENCE South 9° 16' 45" East, 458.5 feet to an iron pipe;

THENCE South 13° 01' 15' West, 564.9 feet to an iron pipe;

THENCE South 5° 56' 45" East, 7,334.6 feet to an iron pipe on the north rightofway line of the Brownsville Navigation District and 1,330 feet from the centerline of the Brownsville Ship Channel for the Southeast corner of this tract;

THENCE with the north rightofway line of the Brownsville Navigation District and parallel to and 1,330 feet north of the centerline of the Brownsville Ship Channel, South 89° 14' West, 1,474.2 feet to a 2-inch pipe and the point of beginning.

The area being 143.97 acres in Share 32 and 157.54 acres in Share 7 for a total of 306.51 acres, more or less.

for and upon the following terms and conditions.

I.

As a consideration for this lease and as bonus for said leased premises, lessee agrees to pay to the District at its office in Brownsville, Texas, in legal tender of the

ORIGINAL DIM

VOL 1096 PAGE 294

Union Carbide
R. J. Townsend
P.O. Box 3370
Brownsville, Tx.

FILED FOR RECORD
AT 10 30 O'CLOCK A M
SEP 29 1977
JOE G. RIVERA
Clerk County Court, Cameron County, Tex.
By [signature] Deputy

21674

STATE OF TEXAS
COUNTY OF CAMERON
I hereby certify that this instrument was FILED on the date and at the time stamped hereon by me and was duly RECORDED in the Volume and page of the named RECORDS of Cameron County, Texas as stamped hereon by me.
SEP 30 1977
Joe G. Rivera
County Clerk
Cameron County, Texas

Drinking Water Parameters

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
Arsenic (ppm)					
1982	0.043	0.027	0.035	0.082	-
1983	0.045	0.032	0.027	0.013	-
1984	ND	ND	ND	ND	-
1985	0.0009	0.0015	0.0014	ND	ND
Barium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985	ND	ND	ND	ND	ND
Cadmium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	0.037	ND	0.047	-
1984	ND	ND	ND	ND	-
1985	ND	ND	ND	ND	ND
Chromium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985	ND	ND	ND	ND	ND
Lead (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	0.47	ND	0.60	-
1984	ND	ND	ND	ND	-
1985	ND	ND	ND	ND	ND

ND = Not Detected

Drinking Water Parameters (Cont.)

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
Mercury (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985	ND	ND	ND	ND	ND
Nitrate (ppm as N)					
1982	0.15	0.23	0.14	0.21	-
1983	0.42	0.50	0.77	0.63	-
1984	0.42	0.55	0.60	0.45	-
1985	0.29	0.54	1.11	0.63	0.71
Fluoride (ppm)					
1982	1.32	0.97	1.48	0.89	-
1983	3.34	2.74	3.45	2.41	-
1984	5.6	4.3	5.0	2.9	-
1985	4.9	3.25	6.0	3.1	4.0
Selenium (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985	0.0001	ND	ND	ND	ND
Silver (ppm)					
1982	ND	ND	ND	ND	-
1983	ND	ND	ND	ND	-
1984	ND	ND	ND	ND	-
1985	ND	ND	ND	ND	ND

ND = Not Detected

Groundwater Quality Parameters

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
TDS (ppm)					
1982	10,700	31,700	9,300	49,000	-
1983	9,320	38,300	9,280	69,600	-
1984	21,700	7,680	17,900	6,400	-
1985	9,530	29,600	8,460	35,000	28,800
Calcium (ppm)					
1982	264	1,190	184	2,360	-
1983	155	1,010	175	1,880	-
1984	-	-	-	-	-
1985	151	543	166	1,591	1,176
Sodium (ppm)					
1982	4,615	7,910	4,140	8,030	-
1983	2,000	7,480	2,130	8,160	-
1984	3,700	9,360	4,140	10,100	-
1985	2,497	6,722	3,256	8,445	7,828
Bicarbonate (ppm)					
1982	1,500	670	1,270	366	-
1983	1,560	704	1,340	400	-
1984	1,880	695	1,354	427	-
1985	1,745	720	1,366	421	139
Chloride (ppm)					
1982	3,660	15,000	2,150	19,200	-
1983	2,950	14,500	2,070	19,400	-
1984	1,970	12,800	2,300	18,600	-
1985	3,286	13,637	2,547	17,252	12,323

Groundwater Quality Parameters (Cont.)

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
Potassium (ppm)					
1982	3.60	5.70	2.24	7.94	-
1983	27.71	46.65	19.00	75.14	-
1984	80	108	73	149	-
1985	36	41	43	113	100
Iron (ppm)					
1982	3.13	2.71	1.13	3.43	-
1983	2.69	1.98	1.08	2.90	-
1984	2.05	2.12	1.11	2.76	-
1985	1.9	3.3	1.9	5.3	1.7
Manganese (ppm)					
1982	1.37	4.01	0.96	5.91	-
1983	0.91	3.26	0.68	5.61	-
1984	0.55	2.93	0.60	6.68	-
1985	0.7	3.9	0.7	6.1	7.4
Sulfate (ppm)					
1982	1,580	2,830	2,820	1,940	-
1983	1,270	2,860	2,660	1,900	-
1984	930	2,950	2,580	1,950	-
1985	1,290	2,939	2,727	1,983	2,890
Magnesium (ppm)					
1982	308	1,440	158	1,730	-
1983	160	1,090	164	1,920	-
1984	92	950	144	1,550	-
1985	154	973	170	1,560	1,076

Attachment D

PH DATA SUMMARY

MW-1 (down)

6.98
7.19
7.22
7.02
(28.41)/4 = 7.10 = $\bar{X}_1$

$(6.98-7.10)^2 = .0144$
$(7.19-7.10)^2 = .0081$
$(7.22-7.10)^2 = .0144$
$(7.02-7.10)^2 = .0064$
(.0433)/3 = .0144 = S_1^2

$\frac{.0144}{4} = .0036 = W_1$

MW-2 (down)

6.60
6.68
6.84
6.55
(26.67)/4 = 6.67 = $\bar{X}_2$

$(6.60-6.67)^2 = .0049$
$(6.68-6.67)^2 = .0001$
$(6.84-6.67)^2 = .0289$
$(6.55-6.67)^2 = .0144$
(.0483)/3 = .0161 = S_2^2

$\frac{.0161}{4} = .0040 = W_2$

MW-3 (down)

7.20
7.26
7.25
7.15
(28.86)/4 = 7.21 = $\bar{X}_3$

$(7.20-7.21)^2 = .0001$
$(7.26-7.21)^2 = .0025$
$(7.25-7.21)^2 = .0016$
$(7.15-7.21)^2 = .0036$
(.0078)/3 = .0026 = S_3^2

$\frac{.0026}{4} = .0006 = W_3$

MW-4 (up)

6.46
6.44
6.55
6.72
(26.17)/4 = 6.54 = $\bar{X}_4$

$(6.46-6.54)^2 = .0064$
$(6.44-6.54)^2 = .0100$
$(6.55-6.54)^2 = .0001$
$(6.72-6.54)^2 = .0324$
(.0489)/3 = .0163 = S_4^2

$\frac{.0163}{4} = .0041 = W_4$

ACB
7/9/86

PH DATA ANALYSIS

MW-1

$$t^* = \frac{7.10 - 6.54}{\sqrt{.0036 + .0041}} = 6.38 \qquad t_c = 5.841 \text{ (0.01 confidence) (two-tailed)}$$

$$t^*/t_c = 6.38/5.841 = 1.09 \rightarrow \text{Significant Increase}$$

MW-2

$$t^* = \frac{6.67 - 6.54}{\sqrt{.0040 + .0041}} = 1.44 \qquad t_c = 5.841$$

$$t^*/t_c = 1.44/5.841 = 0.25 \rightarrow \text{Insignificant}$$

MW-3

$$t^* = \frac{7.21 - 6.54}{\sqrt{.0006 + .0041}} = 9.77 \qquad t_c = 5.841$$

$$t^*/t_c = 9.77/5.841 = 1.67 \rightarrow \text{Significant Increase}$$

ACB
7/9/86

TOC DATA SUMMARY

MW-1 (down)

280
251
275
216
(1022)/4 = 256 = $\bar{X}_1$

$(280-256)^2 = 576$
$(251-256)^2 = 25$
$(275-256)^2 = 361$
$(216-256)^2 = 1600$
(2562)/3 = 854 = S_1^2

854/4 = 214 = W_1

MW-2 (down)

63
54
34
42
(193)/4 = 48 = $\bar{X}_2$

$(63-48)^2 = 225$
$(54-48)^2 = 36$
$(34-48)^2 = 196$
$(42-48)^2 = 36$
(493)/3 = 164 = S_2^2

164/4 = 41 = W_2

MW-3 (down)

147
67
66
89
(369)/4 = 92 = $\bar{X}_3$

$(147-92)^2 = 3025$
$(67-92)^2 = 625$
$(66-92)^2 = 676$
$(89-92)^2 = 9$
(4335)/3 = 1445 = S_3^2

1445/4 = 361 = W_3

MW-4 (up)

50
7
0.4
39
(96.4)/4 = 24 = $\bar{X}_4$

$(50-24)^2 = 676$
$(7-24)^2 = 289$
$(.4-24)^2 = 557$
$(39-24)^2 = 225$
(1747)/3 = 582 = S_4^2

582/4 = 146 = W_4

ACB
7/9/86

TOC DATA ANALYSIS

MW-1

$$t^* = \frac{256-24}{\sqrt{214+146}} = 12.2 \qquad t_c = 4.541 \quad \text{(0.01 confidence) (one-tailed)}$$

$$t^*/t_c = 12.2/4.541 = 2.69 \longrightarrow \text{Significant Increase}$$

MW-2

$$t^* = \frac{48-24}{\sqrt{41+146}} = 1.76 \qquad t_c = 4.541$$

$$t^*/t_c = 1.76/4.541 = 0.39 \longrightarrow \text{Insignificant}$$

MW-3

$$t^* = \frac{92-24}{\sqrt{361+146}} = 3.02 \qquad t_c = 4.541$$

$$t^*/t_c = 3.02/4.541 = 0.66 \longrightarrow \text{Insignificant}$$

ACB
7/9/86

SECTION 4

ERT
A RESOURCE ENGINEERING COMPANY
3000 RICHMOND AVENUE, HOUSTON, TEXAS 77098, (713) 520-9900

environmental and engineering excellence

July 21, 1986

Mr. Scott G. Huling
Permits Section
Hazardous and Solid Waste Division
Texas Water Commission
P. O. Box 13087
Capitol Station
Austin, Texas 78711

Dear Mr. Huling:

The purpose of this letter is to certify that the attached closure plans for the Incinerator, Tank 3326 and Tank 5211 at Union Carbide Corporation's Brownsville, Texas Facility (Notice of Registration No. 31108) are consistent with good engineering practice and, when properly followed, will conform to the closure performance standard.

Sincerely,

Timothy Wippold

Timothy Wippold, P.E.
ERT - A Resource Engineering Company

TW/nr:451-01

INCINERATOR
CLOSURE PLAN

Facility: Union Carbide Brownsville Plant

Address: Star Route Box 90
Brownsville, Texas 78521

TDWR Registration No.: 31108

Prepared by: ERT - A Resource Engineering Company
3000 Richmond Avenue, Suite 400
Houston, Texas 77098

Facility Contact: Ms. Belia Cortez
Solvents and Coatings Material Divison

REGULATORY REQUIREMENTS

This closure plan complies with RCRA regulations as given in 40 CFR, Part 264, Subpart O.

FACILITY DESCRIPTION

A waste incinerator was placed into service at the Brownsville plant in 1964 to dispose of liquid wastes consisting of volatile organic acids, mixed esters, mixed ketones and water. The liquid waste typically contained acetic, formic, propionic and butyric acid (EPA hazardous waste numbers D001, D002, U123) generated from the acetic acid production process. The liquid also contained elevated concentrations of chromium (EPA hazardous waste number D007). Under 40 CFR, 261.3 (c) (2) (i), the residue produced by incineration of the waste acid mixture is considered a hazardous material.

The incinerator was fed by surface storage tanks numbers 5211 and 3326 and has a design capacity to incinerate an average of 5,000 pounds per hour and a maximum of 20,000 pounds per hour of liquid wastes. A 12-foot diameter flameless dispersion stack operated with an exit temperature of 1500°F. Supplemental heat for combustion was supplied by a natural gas burner due to potential changes in the heating value of the residues. The waste residues were fed to the incinerator by a circular manifold and six mechanical atomizing liquid nozzles. The system also incorporated a full flame safeguard and high stack temperature shutdown.

The incinerator was normally used on a periodic basis when the energy-producing boilers, which used waste liquids as fuel, were out of service for an extended period or when it was necessary to dispose of surplus quantities of waste liquids.

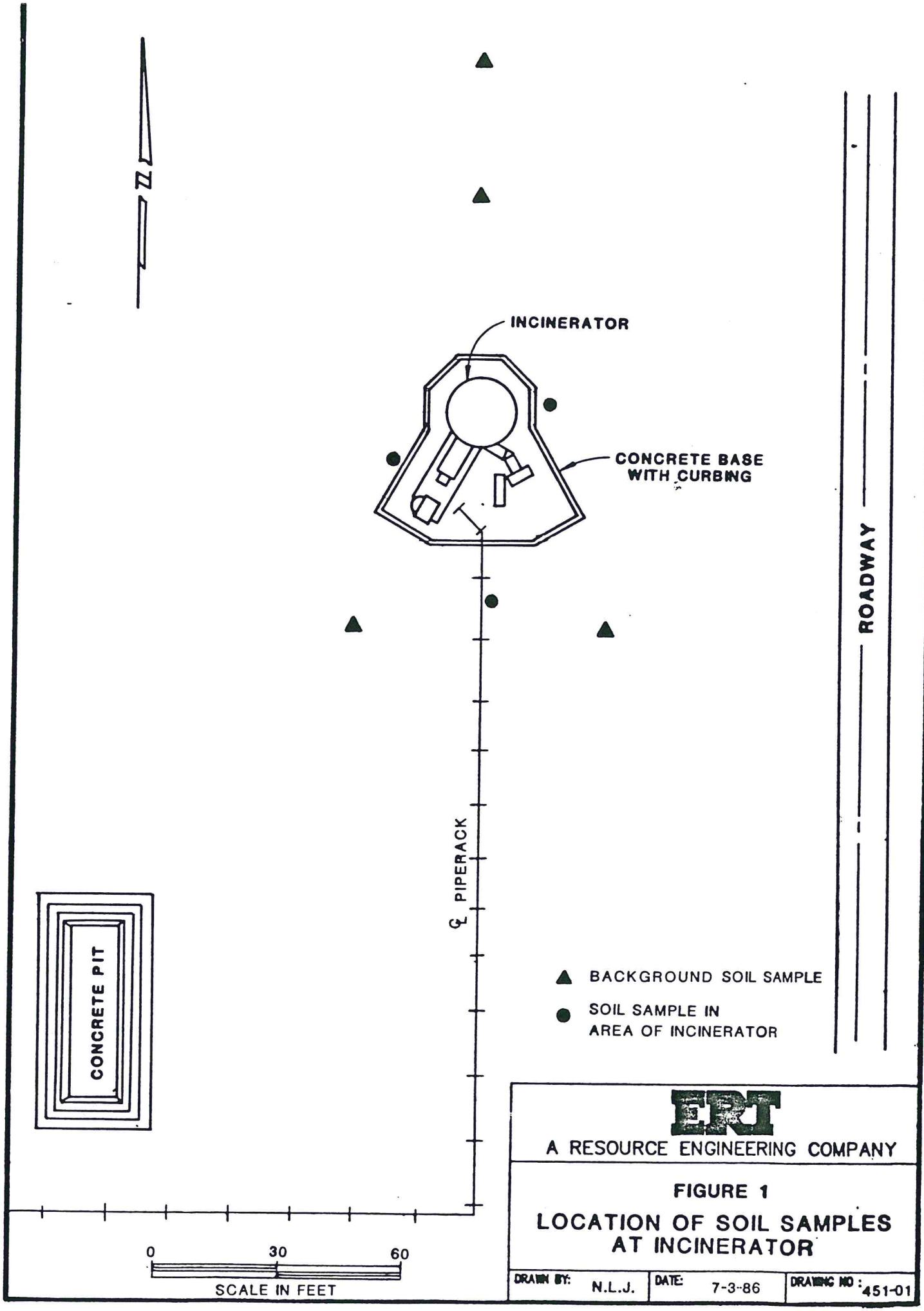
CLOSURE PROCEDURE

The District 11 Field Office will be notified in writing at least 10 days prior to the commencement of these closure activities. To determine the necessity for decontamination and the characteristics of any wastes present, limited sampling will be conducted. Four surficial soil samples will be collected a sufficient distance from the incinerator to provide background concentration values. Three surficial soil samples from around

the incinerator will be collected to determine if contamination of surficial soil occurred during operation of the incinerator. Figure 1 shows the locations of the proposed soil samples. However, before soil sampling, any visually contaminated soil will be removed and disposed of off-site. All soil samples will be analyzed for pH, TOC and chromium. Chromium is the only metal reasonably to be expected in the waste stream which was incinerated and no insecticides/herbicides were handled at the facility. The soil will be deemed contaminated should analyses indicate a concentration of any one of the parameters greater than the background mean plus two standard deviations as calculated from the four background analyses. If the analysis of soils indicates contamination, further sampling and testing will be implemented to better identify the extent of contamination. Once the extent of contamination has been identified, the District 11 Field Office will be notified and informed of the proposed excavation procedures and given an opportunity to examine the site prior to excavation. All soils which do not meet the aforementioned criteria will be excavated for off-site disposal at an approved commercial disposal facility.

Piping and pumps which carried waste materials to the incinerator will be purged using steam. The water collected will be analyzed for pH, flash point and chromium to assure that no hazardous wastes remain in the piping.

Any residues present in the incinerator will be tested for TOC, pH, flash point and chromium in order to see if the residues exhibit hazardous characteristics according to 40 CFR 261, Subpart C. If the residues exhibit hazardous characteristics, all free residues will be removed and then the interior will be sprayed with plant firewater. The wash water will be collected inside the incinerator and tested for TOC, pH, flash point and chromium to assure cleanup. If the residues inside the incinerator do not exhibit hazardous characteristics, the inside will be sprayed with firewater to assure that no leaching of non-hazardous wastes occurs during rainfall events. In either case, the water spraying process will be continued until the TOC concentration in the wash water stabilizes. Wash water from this process will be removed using a vacuum truck for off-site disposal at an approved facility. Following the cleaning procedure, all cleaning equipment will be properly decontaminated. Wash water from equipment decontamination will also be collected and removed for off-site disposal. Table 1 indicates the test methods which will be used for testing soils, residues and water.



ERT

A RESOURCE ENGINEERING COMPANY

FIGURE 1

LOCATION OF SOIL SAMPLES AT INCINERATOR

DRAWN BY:	DATE:	DRAWING NO:
N.L.J.	7-3-86	451-01

Table 1

Analytical Test Procedures [a]

Parameter	Soil	Residues	Water
pH	9040	9040	9040
TOC	505A [b]	505A [b]	505A [b]
Chromium	7190	7190	7190
Flash Point	--	1010	1010

[a] Methods are from EPA's SW-846 (Test Methods for Evaluating Solid Waste) unless otherwise specified.

[b] Method from Standard Methods for the Examination of Water and Wastewater (16th Edition).

CLOSURE SCHEDULE

The closure process will commence within 30 days of closure plan approval. We currently anticipate that the closure program will require approximately 80 days to execute and will be completed in 1986. Table 2 presents the key elements to the closure process and the anticipated duration.

CERTIFICATION

In addition to the appropriate Union Carbide personnel, an independent registered professional engineer will inspect the incinerator and examine the analytical results from all sampling to ensure compliance with the closure plan. A final report with certification will be submitted to TWC which summarizes the aforementioned sampling and provides the results for the analytical program.

PERSONNEL AND ENVIRONMENTAL PROTECTION

To ensure adequate worker and environmental protection, the plant Spill Prevention Control and Countermeasure Plan procedures will be strictly adhered to. This plan ensures that the requirements of equipment preparation are defined and that precautionary measures are taken to protect the safety of personnel and the environment.

Table 2

Incinerator Closure Schedule

By Day	Activity
0	Approval of Closure Plan by the Texas Water Commission (TWC).
5	Notify District 11 Field Office of intent to commence closure activities.
15	Collect residue samples from within incinerator and proceed with analyses.
30	Analysis results are received. Begin appropriate equipment decontamination.
40	Equipment decontamination is completed. Remove all visually contaminated soil and dispose off-site.
42	Collect background and detection soil samples and proceed with analyses.
57	Collect additional soil samples if better definition of contamination extent is needed.
72	Excavate and dispose contaminated soil off-site under TWC Regional Office direction.
75	Final incinerator and soil inspection and certification by independent registered professional engineer and owner.
80	Submittal of closure certification, plus report, to the TWC.

TANK 3326

CLOSURE PLAN

Facility: Union Carbide Brownsville Plant

Address: Star Route Box 90
Brownsville, Texas 78521

TDWR Registration No.: 31108

Prepared by: ERT - A Resource Engineering Company
3000 Richmond Avenue, Suite 400
Houston, Texas 77098

Facility Contact: Ms. Belia Cortez
Solvents and Coatings Material Divison

REGULATORY REQUIREMENTS

This closure plan complies with RCRA regulations for closure as given in 40 CFR Part 264, Subpart J.

FACILITY DESCRIPTION

- Tank 3326 is 44 feet in diameter, 24 feet high with a holding capacity of approximately 273,000 gallons. The tank was put into operation in 1976 for added storage capacity of waste liquid containing acetic, formic, propionic and butyric acid (EPA hazardous waste number D001, D002 and U123) generated from the acetic acid production process. The liquid also contained elevated concentrations of chromium (EPA hazardous waste number D007). The tank was tied to the process line feeding the plant waste incinerator. Recent visual inspection revealed approximately one foot (57 cubic yards) of sludge in the bottom of the tank.

The tank area is enclosed by an earth dike approximately three feet high. Records indicate that the tank rests on a cement slab while the remaining area within the dike is natural ground.

CLOSURE PROCEDURES

The District 11 Field Office will be notified in writing at least 10 days prior to the commencement of these closure activities. To determine the characteristics of the sludge within the tank and the presence of potentially contaminated surficial soil, limited sampling will be conducted. Before any soil sampling is commenced, any visually contaminated soil will be removed and disposed of off-site at an approved facility. Four soil samples from depths of 0" to 6" within the dike area will be collected and analyzed for pH, TOC and chromium. Chromium is the only metal reasonably to be expected in the waste stream and no insecticides/herbicides were handled at the facility. Four surficial soil samples from nearby clean areas will be collected and analyzed to determine background concentrations for these parameters. The soil will be deemed contaminated if results of analyses indicate a concentration of any one of the parameters greater than the mean of the four background soil samples plus two standard deviations. If any of the soil samples indicate contamination,

further sampling will be implemented to determine the extent of contamination so that all the contaminated soil can be excavated and disposed of off-site at an approved facility. Once the extent of contamination has been identified, the District 11 Field Office will be notified and informed of the proposed excavation procedures and given an opportunity to examine the site prior to excavation.

One sample of sludge from within the tank will be collected and analyzed to characterize the sludge for disposal. Analyses will include determination of pH, TOC, chromium and flash point. The majority of the sludge in the tank can be scooped out and disposed of off-site at an approved facility. Water will then be added to the remaining tank sludge to create a slurry mixture which will then be pumped out of the tank by vacuum trucks for proper off-site disposal. The interior of the tank will then be decontaminated using plant firewater. Piping and pumps associated with the tank will be purged with steam. The wash water generated by this process will be collected in the bottom of the tank and removed by vacuum trucks for subsequent off-site disposal. Before disposing of the flush water from each flushing, the water will be analyzed for TOC as an indicator of contamination. When the TOC concentration stabilizes after successive flushings, a final sample will be collected and analyzed for formic acid, pH, chromium and flash point. Upon completion of closure, all cleaning equipment including vacuum trucks and contractor vehicles will be properly decontaminated. The wash water will be collected and removed for off-site disposal. Table 1 indicates the test methods which will be used for testing soils, sludges and water.

CLOSURE SCHEDULE

The closure program will be initiated within 30 days of receiving TWC approval of the closure plan and will require approximately 80 days to execute. Closure is expected to be completed in 1986. Table 2 presents the key elements and the anticipated duration to complete closure of Tank 3326.

Table 1

Analytical Test Procedures [a]

Parameter	Soil	Sludge	Water
pH	9040	9040	9040
TOC	505A [b]	505A [b]	505A [b]
Chromium	7190	7190	7190
Formic Acid	--	--	8250
Flash Point	--	1010	1010

[a] Methods are from EPA's SW-846 (Test Methods for Evaluating Solid Waste) unless otherwise specified.

[b] Method from Standard Methods for the Examination of Water and Wastewater (16th Edition).

Table 2

Tank 3326 Closure Schedule

By Day	Activity
0	Approval of Closure Plan by the Texas Water Commission (TWC).
5	Notify District 11 Field Office of intent to commence closure activities.
10	Collect sample of sludge in tank and proceed with analyses.
30	Removal and off-site disposal of solid portion of sludge in tank. Proceed with equipment decontamination.
40	Equipment decontaminaton is completed. Remove all visually contaminated soil and dispose off-site.
42	Collect background and detection soil samples and proceed with analyses.
57	Collect additional soil samples if better definition of contamination extent is needed.
72	Excavate and dispose contaminated soil off-site under TWC Regional Office direction.
75	Final tank and soil inspection and certification by independent registered professional engineer and owner.
80	Submittal of closure certification, plus report, to the TWC.

CERTIFICATION

In addition to the appropriate UCC personnel, an independent registered professional engineer will inspect the tanks and examine the analytical results from all sampling to ensure compliance with the closure plan. A final report with certification will be submitted to TWC which summarizes the aforementioned sampling and provides the results for the analytical program.

PERSONNEL AND ENVIRONMENTAL PROTECTION

To ensure adequate worker and environmental protection, the plant Spill Prevention Control and Countermeasure Plan procedures will be strictly adhered to. This plan ensures that the requirements of equipment preparation are defined and that precautionary measures are taken to protect the safety of personnel and the environment.

TANK 5211
CLOSURE PLAN

Facility: Union Carbide Brownsville Plant

Address: Star Route Box 90
Brownsville, Texas 78521

TDWR Registration No.: 31108

Prepared by: ERT - A Resource Engineering Company
3000 Richmond Avenue, Suite 400
Houston, Texas 77098

Facility Contact: Ms. Belia Cortez
Solvents and Coatings Material Divison

REGULATORY REQUIREMENTS

This closure plan complies with RCRA regulations for closure as given in 40 CFR Part 264, Subpart J.

FACILITY DESCRIPTION

- Storage Tank No. 5211 is 11 feet in diameter and approximately 20 feet high with a holding capacity of approximately 14,400 gallons. The tank area is enclosed by a 6-inch concrete containment dike and the tank rests on concrete support pedestals over the natural ground surface. Tank 5211 acted as a storage tank for formic acid and miscellaneous flammable liquids. The tank is tied to the process line feeding the plant waste incinerator. The tank was cleaned according to standard UCC tank cleanup procedures when the plant was shut down in March 1983. Briefly, these procedures consisted of checking all transfer lines to the tank to ensure that tank contents and flushing liquid could be pumped to the proper location. The valving was then set up and the transfer was performed and logged. The flushing liquid was then added and circulated in the tank. Flushing was repeated as necessary, and the flushing liquid was routed to its final destination. Tank levels were closely monitored throughout the process, and tanks were air vented following cleaning. Preliminary visual inspection indicates Tank 5211 has been adequately cleaned.

CLOSURE PROCEDURES

The District 11 Field Office will be notified in writing at least 10 days prior to the commencement of these closure activities. Storage Tank No. 5211 will be inspected and tested to determine if additional cleaning is required. At the start of the cleaning process, any remaining residues will be removed from the tank and characterized for subsequent off-site disposal. Analyses will include determination of pH, TOC, chromium and flash point. The tank will then be decontaminated using plant firewater to clean the interior of the tank. Piping and pumps associated with the tank will be purged using steam. The wastewater generated by this process will be collected in the tank and will be removed using a vacuum truck for proper off-site disposal. Before disposing of each flushing of water, the

water will be analyzed for TOC as an indicator of contamination. When the TOC concentration stabilizes after successive flushings, a final sample will be collected and analyzed for formic acid, pH, flash point and chromium. Chromium is the only metal reasonably to be expected in the waste stream and no insecticides/herbicides were handled at the facility.

To determine if surficial soils have been contaminated by occassional surface spills, a surficial soil sampling program will be conducted within the diked area. However, before soil sampling is commenced, any visually contaminated soil will be excavated and disposed of off-site at an approved facility. Surficial soil samples will be collected at three locations adjacent to the tank at depths from 0" to 6" and analyzed for chromium, pH, and TOC. Four surficial soil samples from nearby clean areas will be collected and analyzed to determine background concentrations for these parameters. The soil will be deemed contaminated if it shows a concentration of any one of the parameters greater than the mean of the four background soil samples plus two standard deviations. If any of the soil samples indicate contamination, further sampling will be implemented to determine the extent of contamination so that all the contaminated soil can be excavated and disposed of off-site at an approved facility. Once the extent of contamination has been identified, the District 11 Field Office will be notified and informed of the proposed excavation procedures and given an opportunity to examine the site prior to excavation. Upon completion of closure, all cleaning equipment including vacuum trucks will be properly decontaminated. The wash water will be collected and removed for off-site disposal at an approved facility. Table 1 indicates the test methods which will be used for testing the soil residues and water.

CLOSURE SCHEDULE

The closure program will be initiated within 30 days of receiving TWC approval of the closure plan and will require approximately 70 days to execute, with the closure being completed in 1986. Table 2 presents the key elements and the anticipated duration to complete closure of tank 5211.

Table 1

Analytical Test Procedures [a]

Parameter	Soil	Residues	Water
pH	9040	9040	9040
TOC	505A [b]	505A [b]	505A [b]
Chromium	7190	7190	7190
Formic Acid	--	--	8250
Flash Point	--	1010	1010

[a] Methods are from EPA's SW-846 (Test Methods for Evaluating Solid Waste) unless otherwise specified.

[b] Method from Standard Methods for the Examination of Water and Wastewater (16th Edition).

Table 2

Tank 5211 Closure Schedule

By Day	Activity
0	Approval of Closure Plan by the Texas Water Commission (TWC).
5	Notify District 11 Field Office of intent to commence closure activities.
15	Commence equipment decontamination process.
30	Equipment decontamination is completed. Remove all visually contaminated soil and dispose off-site.
32	Collect background and detection soil samples and proceed with analyses.
47	Collect additional soil samples if better definition of extent of contamination is needed.
62	Excavate and dispose contaminated soil off-site under TWC Regional Office direction.
65	Final tank and soil inspection and certification by independent registered professional engineer and owner.
70	Submittal of closure certification, plus report, to the TWC.

CERTIFICATION

In addition to the appropriate UCC personnel, an independent registered professional engineer will inspect the tank and examine the analytical results from all sampling to insure compliance with the closure plan. A final report with certification will be submitted to TWC which summarizes the aforementioned sampling and provides the results for the analytical program.

PERSONNEL AND ENVIRONMENTAL PROTECTION

To ensure adequate worker and environmental protection, the plant Spill Prevention Control and Countermeasure Plan procedures will be strictly adhered to. This plan ensures that the requirements of equipment preparation are defined and that precautionary measures are taken to protect the safety of personnel and the environment.

Brownsville Navigation District
of Cameron County, Texas
SECRETARY'S OFFICE

File No. 1327

THE STATE OF TEXAS §
§
COUNTY OF CAMERON §

FILE COPY

THIS CONTRACT AND AGREEMENT this day entered into by and between the BROWNSVILLE NAVIGATION DISTRICT OF CAMERON COUNTY, TEXAS, a navigation district organized, created, and existing under and by virtue of the laws of the State of Texas and an agency of the State of Texas, with its domicile in Brownsville, Cameron County, Texas, hereinafter styled "District", authorized under and by virtue of the provisions of Section 78 of Article 8263a of Vernon's Annotated Revised Civil Statutes of the State of Texas, Revision of 1925, to lease lands to any individual or corporation and charge therefor reasonable tolls, fees or other charges, and UNION CARBIDE CORPORATION, a private corporation organized, created and existing under and by virtue of the laws of the State of New York, with its principal office in New York City, hereinafter styled "Lessee",

W I T N E S S E T H:

The said District does by these presents lease and demise unto the said Lessee all that certain tract comprising 306.51 acres, more or less, of which 148.97 acres are out of Share 32 of the Espiritu Santo Grant in Cameron County, Texas, and 157.54 acres are out of Share 7 of the San Martin Grant in said County, and being more particularly described as follows, to-wit:

> All that certain tract, piece or parcel of land comprising 148.97 acres out of Share 32, Espiritu Santo Grant and 157.54 acres out of Share 7, San Martin Grant, for a total of 306.51 acres in Cameron County, Texas, and more particularly described as follows:

FILE COPY

BEGINNING at a 2-inch iron pipe located at the intersection of the north right-of-way line of the Brownsville Navigation District and the common share and grant line between Share 32, Espiritu Santo Grant and Share 7, San Martin Grant and the pipe being 1,320 feet off the centerline of the Brownsville Ship Channel;

THENCE South 69° 14' West, 1,303.9 feet to an iron pin for the Southwest corner of this tract;

THENCE North 3° 14' 30" West, 4,998.5 feet to an iron pin for the Northwest corner of this tract;

THENCE North 84° 05' 45" East, 2,170.6 feet to an iron pipe;

THENCE North 5° 54' 15" West, 4,314.2 feet to an iron pipe on the south right-of-way line of Cameron County Drainage District No. 1 for a Northwest corner;

THENCE along the south side of said drainage ditch, North 39° 01' East, 123.6 feet to an iron pipe;

THENCE North 79° 21' East, 473.3 feet to an iron pipe;

THENCE South 9° 16' 45" East, 458.5 feet to an iron pipe;

THENCE South 13° 01' 15" West, 964.0 feet to an iron pipe;

THENCE South 5° 56' 45" East, 7,354.6 feet to an iron pipe on the north right-of-way line of the Brownsville Navigation District and 1,320 feet from the centerline of the Brownsville Ship Channel for the Southeast corner of this tract;

THENCE with the north right-of-way line of the Brownsville Navigation District and parallel to and 1,320 feet north of the centerline of the Brownsville Ship Channel, South 69° 14' West, 1,474.2 feet to a 2-inch pipe and the point of beginning.

The area being 148.97 acres in Share 32 and 157.54 acres in Share 7 for a total of 306.51 acres, more or less.

for and upon the following terms and conditions.

I.

As a consideration for this lease and as rental for said leased premises, Lessee agrees to pay to the District at its office in Brownsville, Texas, an annual rental of Forty-five

SECTION 2

CLOSURE OF BALL MILL RESIDUE BASIN

I. REQUEST

Union Carbide Corporation (UCC) requests the Texas Water Commission (TWC) to concur with UCC's reclassification of the Brownsville Plant Ball Mill Residue Basin from an active Class I hazardous industrial solid waste surface impoundment to an inactive Class I non-hazardous industrial solid waste surface impoundment.

1. The basin no longer contains hazardous wastes since all the deposited hazardous wastes have lost their hazardous characteristics. No listed wastes were deposited in basin.

2. The underlying soil is not hazardous since it is not hazardous due to characteristics.

3. The basin will not receive any more solid waste.

UCC believes the above scenario is sufficient to demonstrate achievement with the 31 TAC 335.286 closure performance standard in that no remaining material in the surface impoundment is hazardous due to characteristics.

II. BACKGROUND

Figure 1 provides a plan view of the residue basin. The basin was in operation from 1975 to mid-1983. The basin is roughly 150' x 250'. The maximum capacity is approximately 4200 cubic yards; however, the basin is presently only partially full. The basin is above grade with compacted clay dikes and in-situ clay bottom.

The basin has no liners. There are three unloading stations (one at south side; two on east side).

The basin received seven residue streams, three of which were hazardous. The hazardous wastes were:

1. Ball Mill Residues--ignitable (D001); corrosive (D002); chromium (D007).

2. Sodium Hydroxide Solution--corrosive (D002); chromium (D007).

3. Wastewater Sludge--chromium (D007).

The last shipment of hazardous waste received by the basin occurred July 27, 1983.

III. JUSTIFICATION

In July 1985, Environmental Research and Technology, Inc. conducted a sampling/analysis program of the basin contents to determine if hazardous wastes remain in the basin. The report of this program is attached.

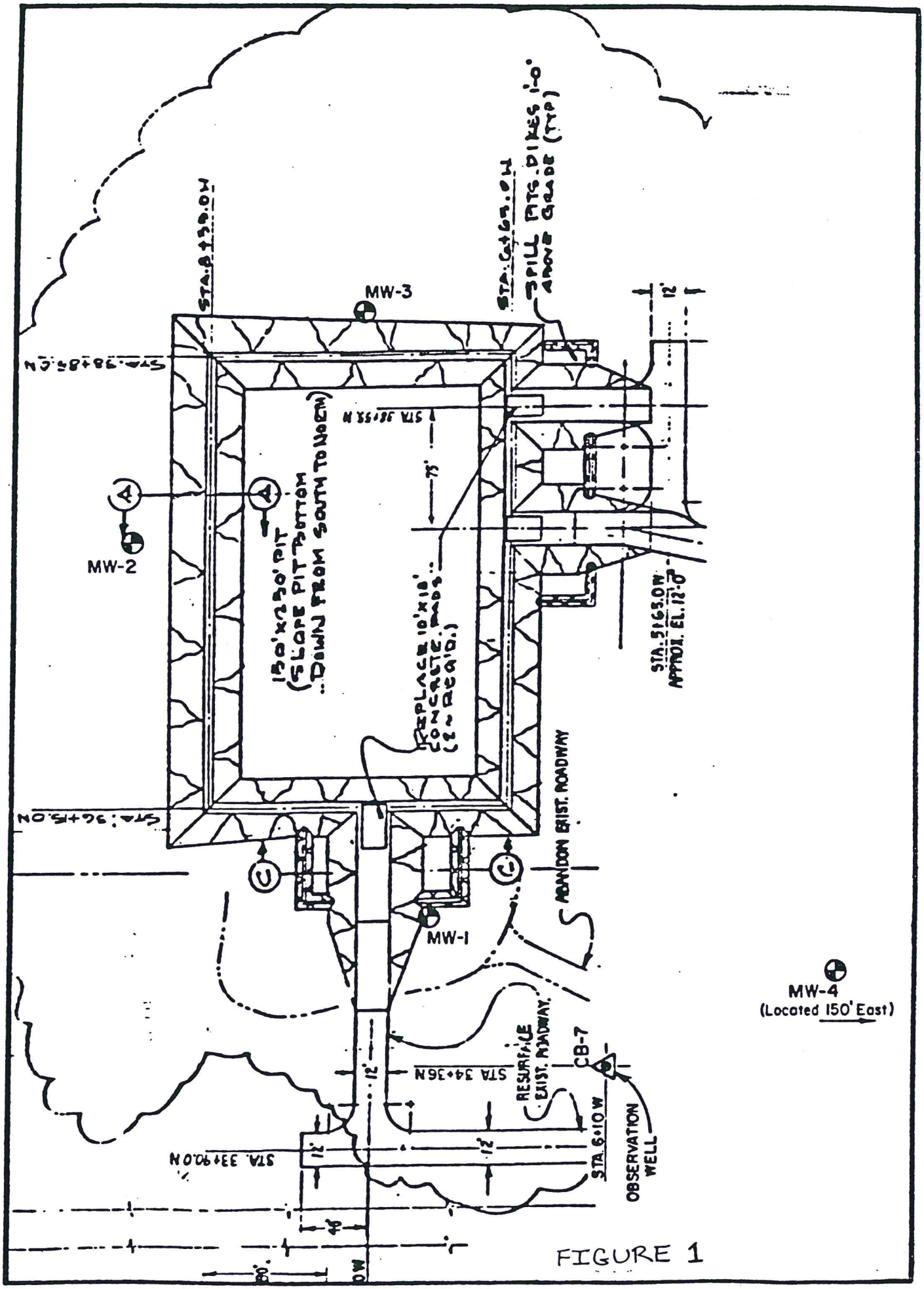

MW-3
MW-2
MW-1
MW-4
(Located 150' East)
STA. 38+85.0N
STA. 36+15.0N
STA. 34+36N
STA. 33+90.0N
STA. 8+39.0W
STA. 6+10W
STA. 5+63.0W
APPROX. EL. 12.0'
SPILL PTG. DIKES 1.0' ABOVE GRADE (TYP.)
150'x250' PIT (SLOPE PIT BOTTOM DOWN FROM SOUTH TO NORTH)
REPLACE 10'x10' CONCRETE PADS (2 REQ'D.)
ABANDON EXIST. ROADWAY
RESURFACE EXIST. ROADWAY
CB-7
OBSERVATION WELL
12'
75'
8'

FIGURE 1

Samples were taken of the impounded water, bottom sludge and underlying soil and analyzed for the hazardous characteristics that caused the incoming wastes to be hazardous. See Table 1, "Analytical Test Procedures," for the listing of analytical test procedures used during the program. The results conclusively show that the material in the basin and the underlying soil are not RCRA hazardous.

IV. CLOSURE CERTIFICATION

As required by 31 TAC 335.216, attached to this closure plan is the closure certification signed by both UCC and an independent registered professional engineer. The certification states that the Ball Mill Residue Basin has been closed in accordance with this plan and states that the unit should now be reclassified as an inactive Class I non-hazardous industrial solid waste surface impoundment.

Table 1

Analytical Test Procedures [a]

Parameter	Soil	Sludge	Water
pH	9040	9040	9040
Oil & Grease	413.1 [b]	413.1 [b]	413.1 [b]
TOC	505A [c]	505A [c]	505A [c]
Moisture Content	160.3 [b]	160.3 [b]	--
Flash Point	1010	1010	1010
Selenium	7741	7741	7741
Silver	7760	7760	7760
Arsenic	7061	7061	7061
Barium	7080	7080	7080
Cadmium	7130	7130	7130
Chromium	7190	7190	7190
Lead	7420	7420	7420
Mercury	7471	7471	7470

a Methods are from EPA's SW-846 (Test Methods for Evaluating Solid Waste) unless otherwise specified.

b Methods from EPA-600/4-79-020 (Methods for Chemical Analysis of Water and Wastes).

c Method from Standard Methods for the Examination of Water and Wastewater (16th Edition).

NOTE: The standard EP Toxicity test procedures as described in 40 CFR Part 261 Appendix II were used to analyze liquid soil and sludge samples. Part A of these test procedures describe the extraction procedure which was used.

ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.
12012 WICKCHESTER, SUITE 200 HOUSTON, TEXAS 77079 (713) 558-8500

ERT Ref No. D866-230

September 25, 1985

Mr. Edward Robertson
Union Carbide Corporation
Solvents and Coatings Division
P. O. Box 3370
Brownsville, Texas 78520

Final Basin Field Report
Union Carbide Corporation
Brownsville, Texas

Dear Mr. Robertson:

On July 29 and 30, 1985, Environmental Research and Technology, Inc. (ERT) conducted a sampling program at the inactive ball mill basin at Union Carbide Corporation's (UCC) Brownsville Plant. The objective of the program was to collect a sufficient number of samples of the basin liquid, sludge and underlying soil to chemically characterize these materials. The results of the analyses of liquid and sludge samples have been used to determine the final course of action (i.e., paper closure, physical closure/post closure, permitting) at the basin for RCRA compliance. The results of the analyses of the soil samples have been used to assess potential leakage of contaminants from the basin into the subsurface. The remainder of this report presents detailed discussions of the sampling procedures and field activities and the results and conclusions of the sample analyses.

Sampling Procedures and Field Activities

Sampling was performed from a platform suspended over the basin by a crane. Initially, surface liquid samples and depth readings were taken at the four locations shown in Figure 1. Exact sampling locations were then

staked out for further sample collection. Samples collected during the field program include four surficial liquid samples, four liquid column samples, four sludge samples, and eight soil samples. The samples were not composited.

At each location field personnel collected a representative sample of the liquid column. At locations B-1 and B-2 (Figure 1), grab samples were obtained by immersing the containers into the shallow liquid. At locations B-3 and B-4 (Figure 1) a stoppered PVC tube was used to sample the liquid column. Field observations indicated a floating top liquid layer in the basin. This surficial layer was collected and analyzed to ensure there was no phase separation which could produce a low flash point liquid.

Following liquid collection, thickness of sludge at the bottom of the basin was determined by probing, and sludge samples were collected. Table 1 presents the thickness of the sludge layer. At locations B-1 and B-2, containers were immersed to carefully collect the full thickness of sludge. Excess liquid was then removed from the sampling container. At locations B-3 and B-4, sludge samples were collected using stoppered PVC pipe.

Following sludge sampling, four-inch PVC casing was driven through the sludge and seated approximately six inches into the underlying soil. The liquid and sludge were pumped out of the casing, and soil samples were obtained by driving a split-spoon sampler from 0 to 12 inches and from 12 to 24 inches. The upper and lower samples were retained separately. The borings were then grouted with a cement-bentonite mixture, and the casing was removed.

All samples were uniquely labeled upon collection to identify project name and number, sample number and type, sampling date and time, and name of ERT field personnel. A field log describing pertinent field data was kept by the ERT field supervisor.

Laboratory Analyses

Samples collected during the field program were analyzed by Pan American Laboratories in Brownsville, Texas. Samples were analyzed for the following parameters:

- o pH;
- o TOC;
- o Oil and Grease (O&G);
- o EP Toxicity; and
- o Flash Point.

Additionally, the moisture content of sludge and soil samples was determined. Flash points which were originally requested for liquid samples were not determined. Subsequently, UCC has collected additional surficial liquid samples which were submitted for determination of flash point. Analyses were performed in accordance with U.S. EPA analytical procedures.

Results and Conclusions

Analytical results for soil, sludge and liquid samples collected during the investigation are presented in Tables 2 through 4. Table 5 presents the maximum concentrations for characteristics of EP Toxicity for comparision with analytical results and the analytical detection limits.

Hazardous materials placed in the ball mill basin during its operation included wastes with concentrations of chromium in excess of 5.0 parts per million (ppm), low flash point (< 140°F) and corrosive material (ph $\geq$ 12.5). The laboratory analyses indicate that in no case did the concentration of metals in any sample exceed the EPA maximum concentration limit for EP Toxicity. Furthermore, values for pH are only slightly basic (pH $\leq$ 9.49) for all samples. Based on these analyses, the contents of the ball mill basin at present would not be classified as hazardous according to RCRA regulations.

Respectfully submitted,

Thomas M Johnson

Thomas M. Johnson
Senior Hydrogeologist

TMJ/ars
cc: Mr. Alan Booth

Table 1

Basin Sludge Thickness

Sampling Location	Depth to Sludge (in.)	Depth to Soil (in.)	Sludge Thickness (in.)
B-1	--	--	1.5
B-2	6.5	10	3.5
B-3	13.5	18	4.5
B-4	17	22	5.0

Table 2

Results of Soil Analyses

Parameter	Units	Sample Number[1]							
		SSB-1		SSB-2		SSB-3		SSB-4	
		upper[2]	lower[3]	upper	lower	upper	lower	upper	lower
pH	--	8.44	8.34	8.09	9.42	8.34	8.05	8.85	8.83
Oil and Grease	%	1.87	0.80	6.71	1.64	2.41	0.11	0.29	.009
TOC	ppm	13,600	19,600	24,120	24,120	22,610	11,310	18,090	5,280
Moisture Content	%	39.2	26.5	35.5	9.5	44.4	23.9	36.0	22.0
Flash Point	°F	>210	>210	>210	>210	>210	>210	>210	>210
EP Toxicity									
Selenium	ppm	ND[4]	ND	ND	ND	ND	ND	ND	ND
Silver	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Barium	ppm	ND	25[5]	ND	ND	ND	89[5]	ND	66[5]
Cadmium	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ppm	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ppm	ND	ND	ND	ND	ND	0.004	ND	ND

Footnotes

1 See Figure 1 for sampling locations.
2 Upper samples from 0" to 12" depth
3 Lower samples from 12" to 24" depth
4 ND = Not Detected. See Table 5 for EPA maximum concentrations for EP Toxicity and analytical detection limits.
5 Barium believed to be a natural component of the underlying soil.

Table 3

Results of Sludge Analyses

Parameters	Units	Sample Number [1]			
		SLSB-1	SLSB-2	SLSB-3	SLSB-4
pH	--	9.36	9.22	8.89	9.10
Oil and Grease	%	1.56	10.85	0.72	2.45
TOC	ppm	10,550	17,340	19,600	13,750
Moisture Content	%	25.0	58.2	67.9	27.3
Flash Point	°F	>210	>210	>210	>210
EP Toxicity					
Selenium	ppm	ND[2]	ND	ND	ND
Silver	ppm	ND	ND	ND	ND
Arsenic	ppm	ND	ND	ND	ND
Barium	ppm	ND	ND	ND	ND
Cadmium	ppm	ND	ND	ND	ND
Chromium	ppm	ND	ND	ND	ND
Lead	ppm	ND	ND	ND	ND
Mercury	ppm	ND	ND	ND	ND

Footnotes:

[1] See Figure 1 for Sampling locations.

[2] ND = Not Detected. See Table 5 for EPA maximum concentrations for EP Toxicity and analytical detection limits.

Table 4

Results of Water Analyses

Parameters	Units	Sample Number[1]			
		WSB-1	WSB-2	WSB-3	WSB-4
pH	--	9.49	9.49	9.48	9.48
Oil and Grease	ppm	118	288	188	8572
TOC	ppm	2,375	2,170	2,315	3,627
Flash Point[2]	°F	>230	>230	>230	>230
EP Toxicity					
Selenium	ppm	ND[3]	ND	ND	ND
Silver	ppm	ND	ND	ND	ND
Arsenic	ppm	ND	ND	ND	ND
Barium	ppm	ND	ND	ND	ND
Cadmium	ppm	ND	ND	ND	ND
Chromium	ppm	3.15	3.21	3.14	2.95
Lead	ppm	ND	ND	ND	ND
Mercury	ppm	ND	ND	ND	ND

Footnotes:

[1] See Figure 1 for Sampling locations
[2] Flash Points are for surficial water samples.
[3] ND = Not Detected. See Table 5 for EPA maximum concentrations for EP Toxicity and analytical detection limits.

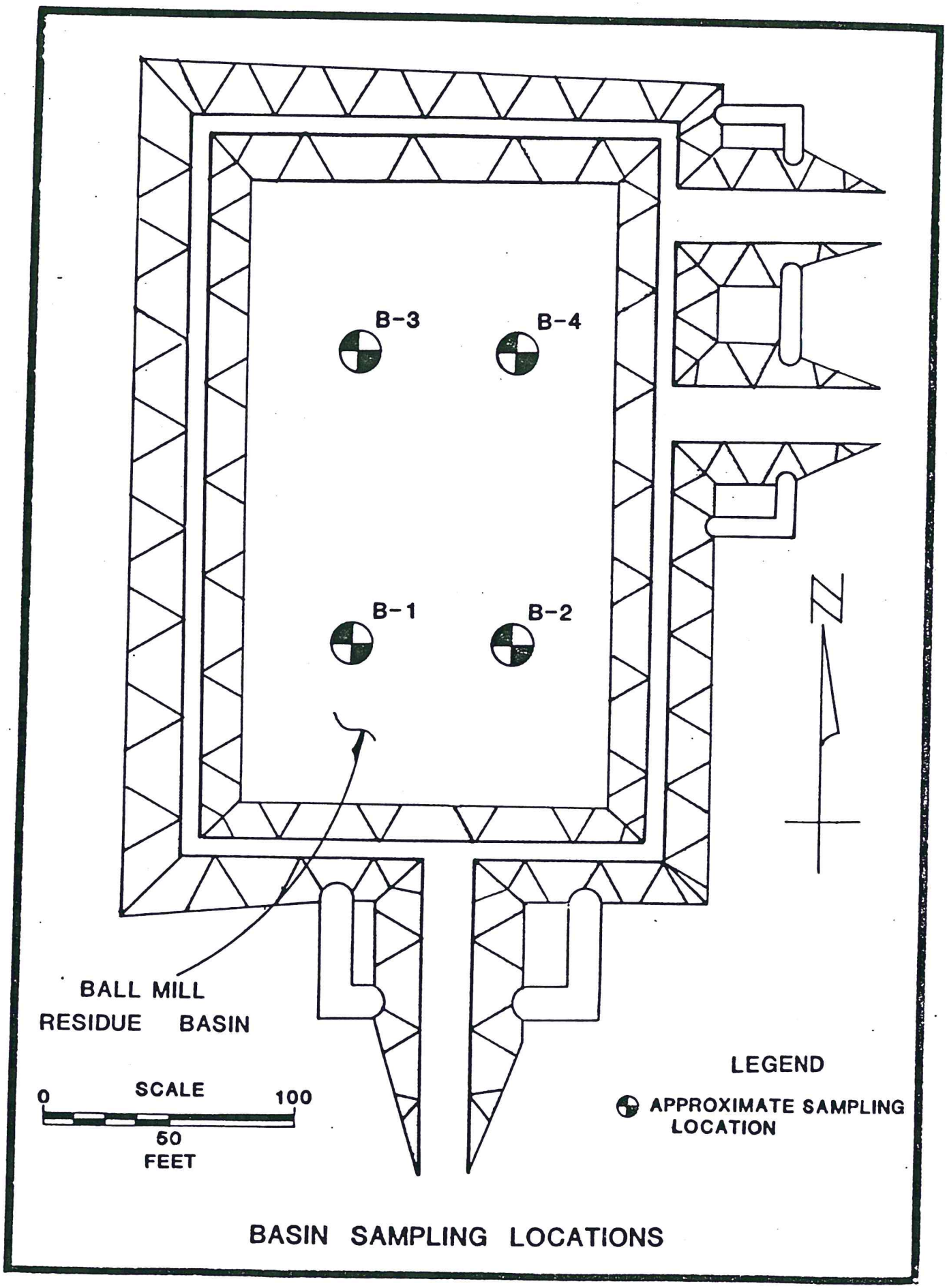
Table 5

Maximum Concentrations for Characteristics of EP Toxicity [1] and Detection limits.

Parameter	Maximum Concentration (ppm)	Detection Limit (ppm)
Selenium	1.0	0.1
Silver	5.0	0.1
Arsenic	5.0	0.1
Barium	100.0	5
Cadmium	1.0	0.05
Chromium	5.0	0.2
Lead	5.0	1
Mercury	0.2	0.002

Footnote:

[1] From 40 CFR 261.24, Table 1



BASIN SAMPLING LOCATIONS

FIGURE 1

ERT
A RESOURCE ENGINEERING COMPANY
3000 RICHMOND AVENUE, HOUSTON, TEXAS 77098, (713) 520-9900

environmental and engineering excellence

July 21, 1986

Mr. Scott G. Huling
Permits Section
Hazardous and Solid Waste Division
Texas Water Commission
P.O. Box 13087
Capitol Station
Austin, Texas 78711

Dear Mr. Huling:

The purpose of this letter is to certify that the Ball Mill Residue Basin at Union Carbide Corporation's Brownsville, Texas Facility (Facility Unit No. 01 on Notice of Registration No. 31108) is closed in accordance with 40 CFR 265.228(b). The basis of this certification is described in the revised Section 1 report which contains the closure plan of the Ball Mill Residue Basin and the Field Report describing the sampling program at the Ball Mill Residue and its results. During the field program water, sludge and underlying soil samples were collected and analyzed for characteristics of hazardous wastes. The results of the analytical program show that none of the samples exhibit characteristics of hazardous wastes; therefore, the Ball Mill Residue Basin should be considered closed.

We thus certify that the Ball Mill Residue Basin (Facility No. 01 on Notice of Registration No. 31108) is closed in accordance with 40 CFR 265.228(b). Furthermore, since the field program demonstrated that the wastes do not exhibit characteristics of hazardous wastes, the basin should be reclassified as a Class I non-hazardous surface impoundment.

Sincerely,

T. T. Elgin

T.T. Elgin
Vice President - Operations
Solvents and Coatings Material Division
Union Carbide Corporation

Timothy Wippold

Timothy Wippold, P.E.
ERT - A Resource Engineering Company

/nar:451-01

SECTION 3

STATUS OF GROUNDWATER UNDERNEATH BALL MILL RESIDUE BASIN

I. REQUEST

Union Carbide Corporation (UCC) requests the Texas Water Commission (TWC) to review the groundwater quality data for the Ball Mill Residue Basin and to determine if further groundwater monitoring and/or corrective action is required for the closed (decontaminated) surface impoundment.

II. BACKGROUND

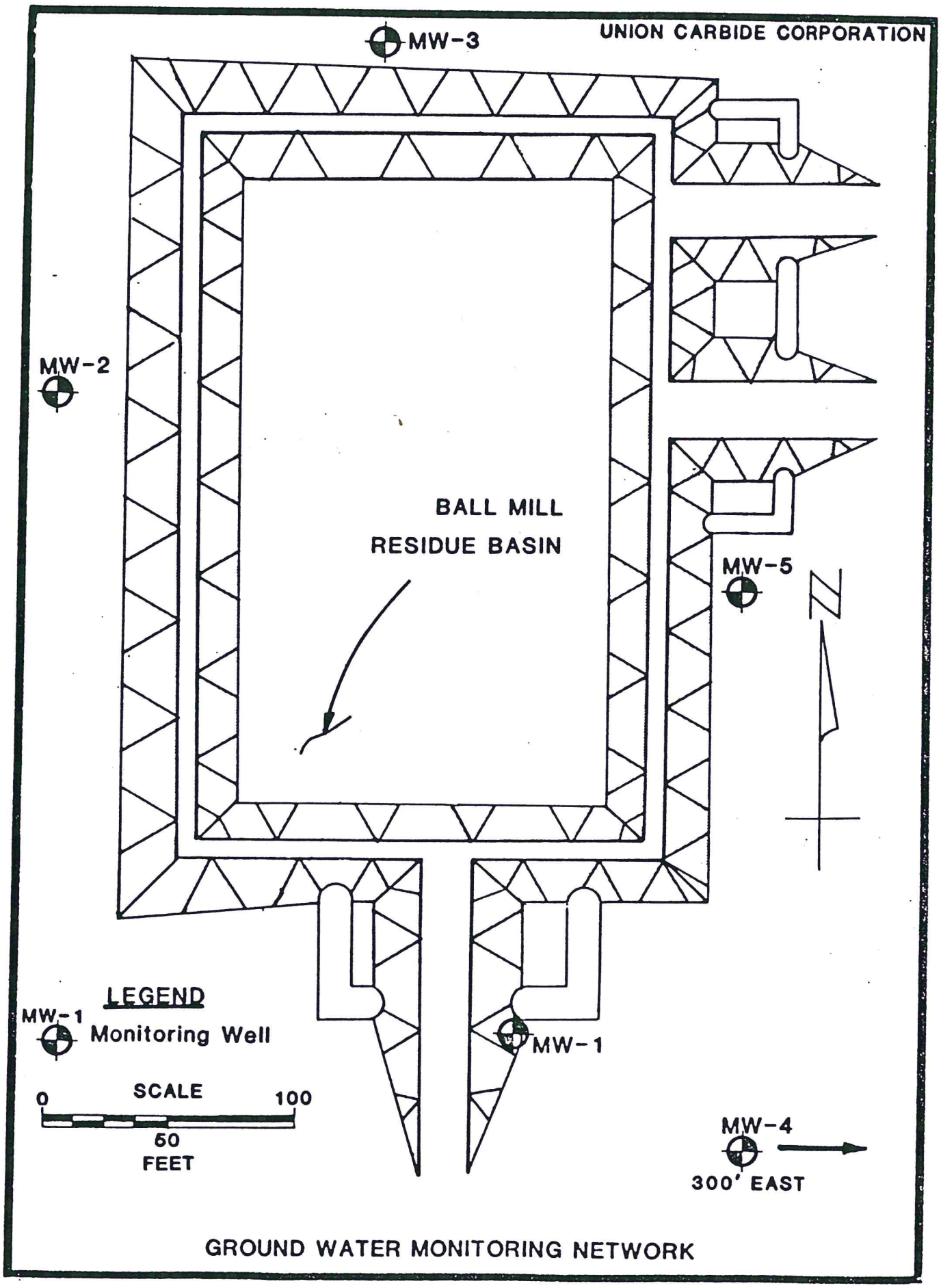
A. Local Geology

A geologic investigation of the site was conducted by NFS/National Soil Services, Inc. in 1981. The results indicate the basin to be on top of 10 to 15 feet of firm to hard clay and silty clay with occasional thin sand seams followed by 2 to 3 feet of medium dense sand and clayey silt. The next layer consisted of 3 to 6 feet of hard clay and sandy clay.

The top clay layer has a laboratory measured permeability of less than 10^{-8} cm/sec (NFS/National Soil Service) while the lower clay layer has a laboratory measured permeability of 5.2×10^{-8} cm/sec (Environmental Research and Technology).

B. Monitoring Well Network

In May 1982, NFS/National Soil Services, Inc. installed four monitoring wells (three down-gradient; one up-gradient) around the basin. Figure 1 shows the locations of the wells. Wells MW-1, MW-2 and MW-3 are the down-gradient (contamination detection) wells and MW-4 is the up-gradient (unaffected) well. Well logs of the wells are presented in Attachment A. Note: Wells are screened to sample the sand layer between the two clay layers.



GROUND WATER MONITORING NETWORK

FIGURE 1

In September 1985, Environmental Research and Technology, Inc. installed a fifth monitoring well (MW-5) to assure that any contaminant plume leaving the basin through the sand layer would be detected. Refer to Figure 1 for well location and Attachment A for well logs.

Available hydrogeolic data indicates that any seepage from the surface impoundment would tend to flow through the 2 to 3 feet thick sand/silt seam to the nearby cooling water laterals located on the north, east and west sides of the impoundment (NFS/National Soil Service). See Figure 2. Thus, the impoundment acts as a surcharge point for the immediate area.

All the monitoring wells sample the sand/silt seam as shown in Attachment A. Any leakage from the impoundment would be detected by wells MW-1,2,3 and 5 which are adjacent to the impoundment while background groundwater is sampled by well MW-4 which is located a considerable distance from the impoundment. Groundwater elevation data in Attachment C indicate that the impoundment does act as a surcharge point in that MW-4 groundwater elevations tend to be at the lower end of the elevation range.

It is UCC's position that the existing monitoring well network does satisfy 40 CFR 265 Subpart F performance requirements.

Source: "Soils Investigation Report, Waste Processing Facility, Union Carbide Coatings Materials Plant, Brownsville, Texas," NFS/National Soil Services, Report No. H-8175, Nov. 12, 1981.

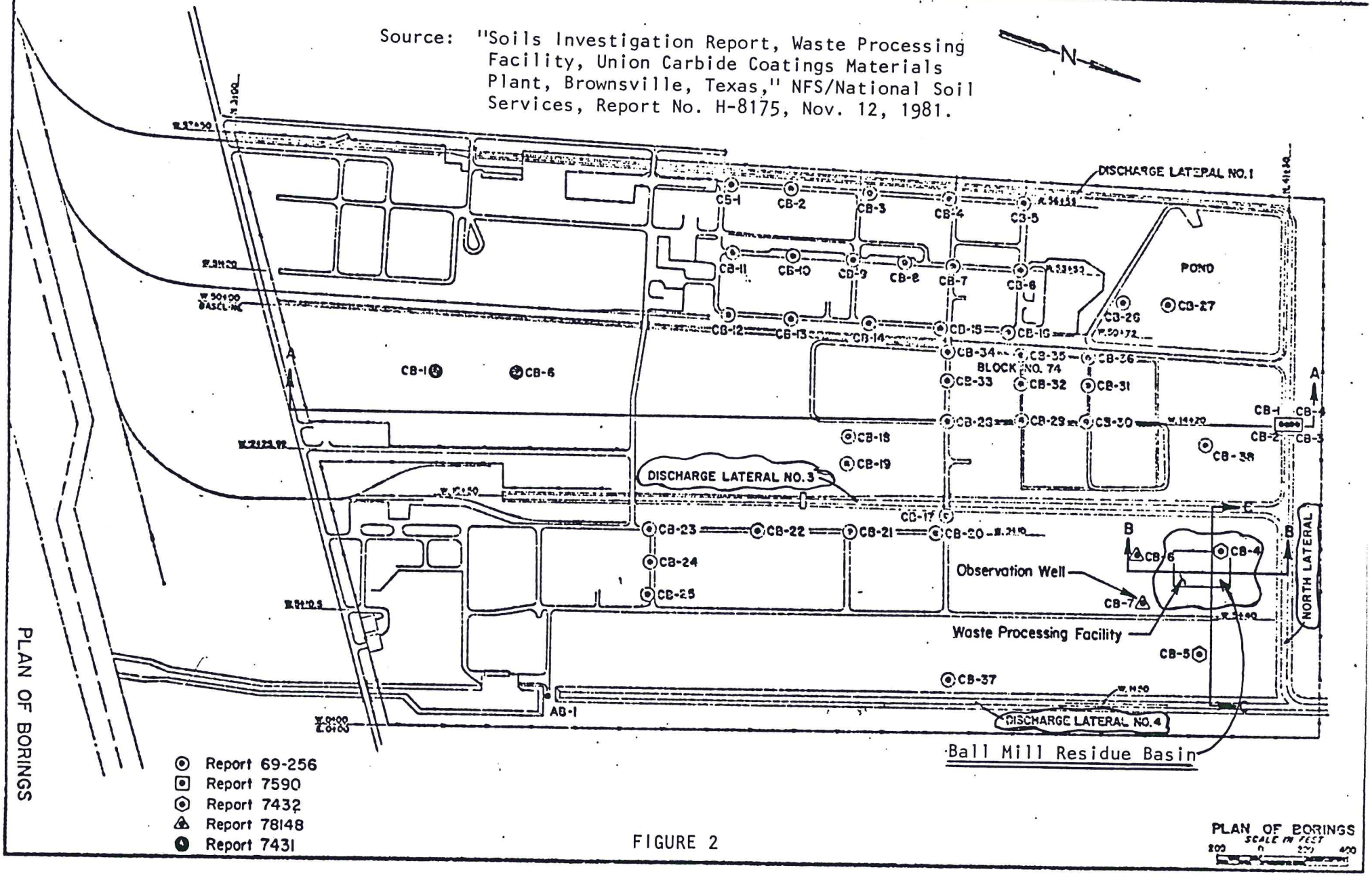


FIGURE 2

C. Monitoring Program

Due to the low permeability of the upper clay layer, UCC requested Texas Department of Water Resources (TDWR) to waive groundwater monitoring. Instead, TDWR granted UCC a partial waiver of monitoring requirements. See Attachment B.

The waiver stated that UCC must annually measure the groundwater surface elevation and analyze water samples for the following parameters/compounds in all the monitoring wells.

Arsenic	Selenium	Chloride
Barium	Silver	Fluoride
Cadmium	Total Dissolved Solids	Nitrate
Chromium	Total Organic Carbon	Potassium
Lead	Calcium	Iron
Mercury	Sodium	Manganese
	Bicarbonate	

D. Monitoring Results

Attachment C presents the data gathered by the groundwater monitoring program. Note: During the compiling of the data, it was noticed that well MW-1 was inadvertently labelled up-gradient while well MW-4 was labelled down-gradient in the annual summary reports. Attachment C presents the correct well designations.

Attachment D presents the statistical analysis of the groundwater contamination parameters (pH and total organic carbon). A student's t-test was performed on the four years worth of data. Note: Data from MW-5 was excluded since only one year's (one sample) worth of data is available.

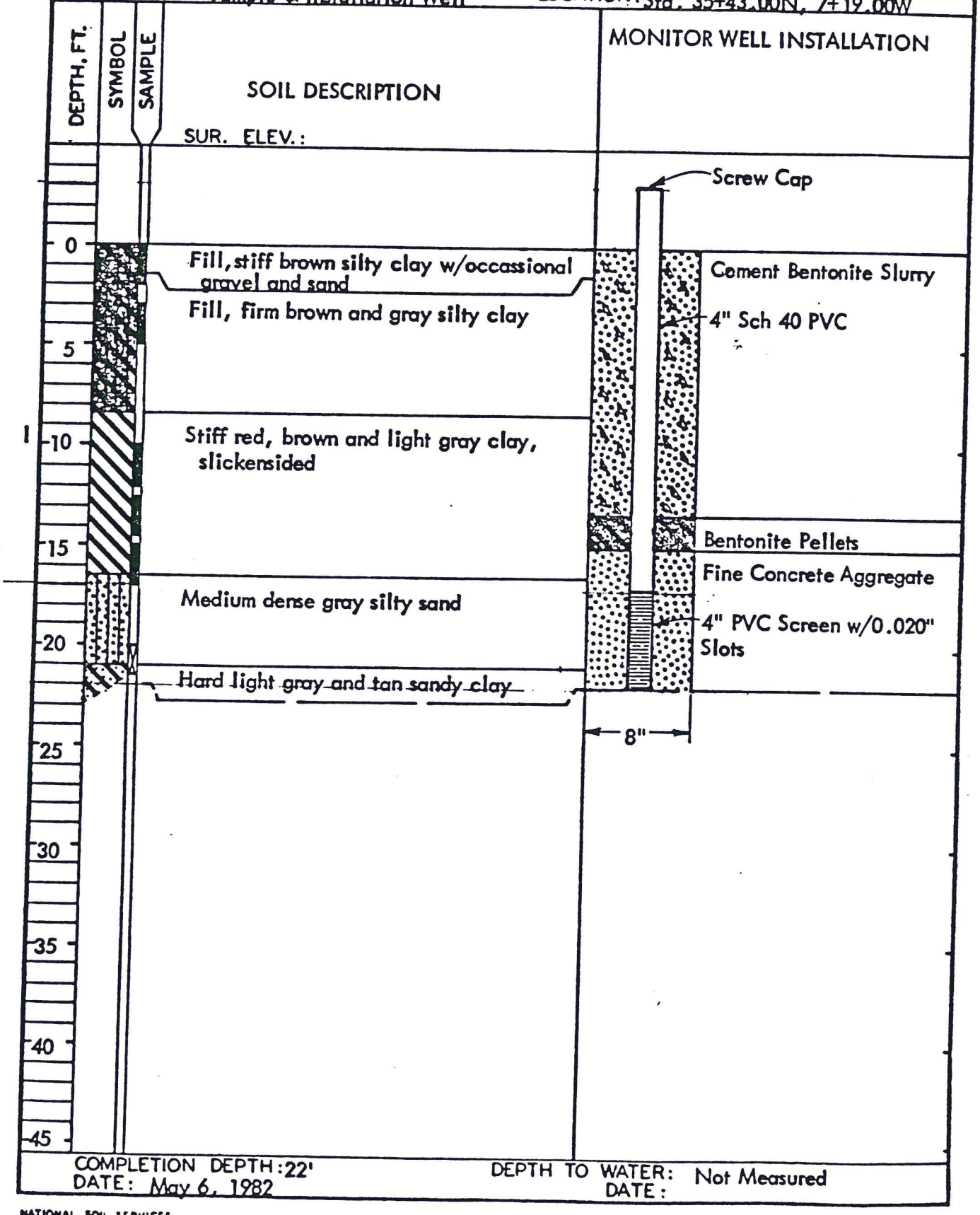
Using the prescribed 0.01 level of significance, the analyses indicate significant increases in both pH and total organic carbon (pH in MW-1 and MW-3; TOC in MW-1).

Attachment A

LOG OF BORING NO. MW-1

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 35+43.00N, 7+19.00W



COMPLETION DEPTH: 22'
DATE: May 6, 1982

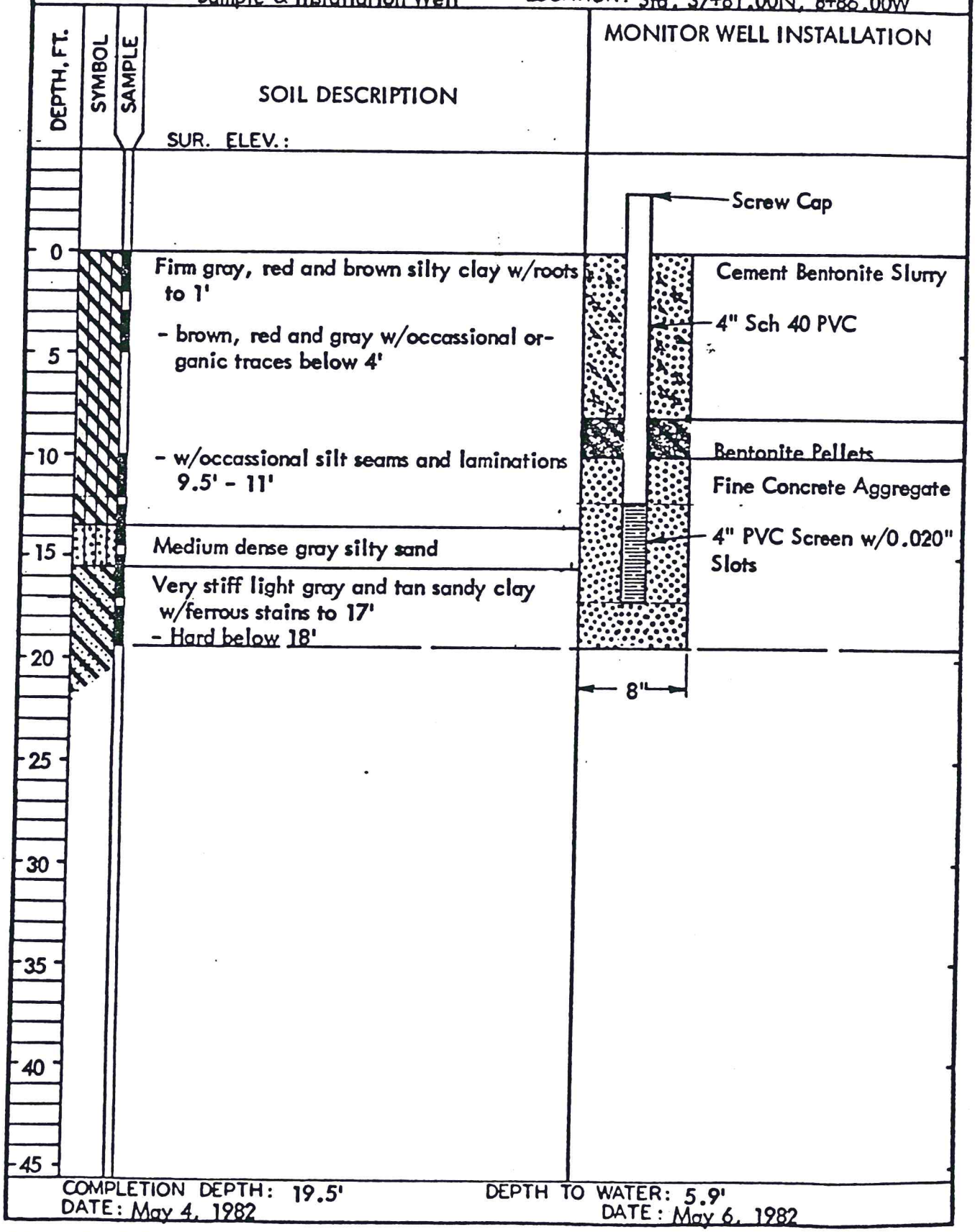
DEPTH TO WATER: Not Measured
DATE:

NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 2

LOG OF BORING NO. MW-2
MONITOR WELLS
HAZARDOUS WASTE PROCCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 37+81.00N, 8+86.00W



COMPLETION DEPTH: 19.5'
DATE: May 4, 1982

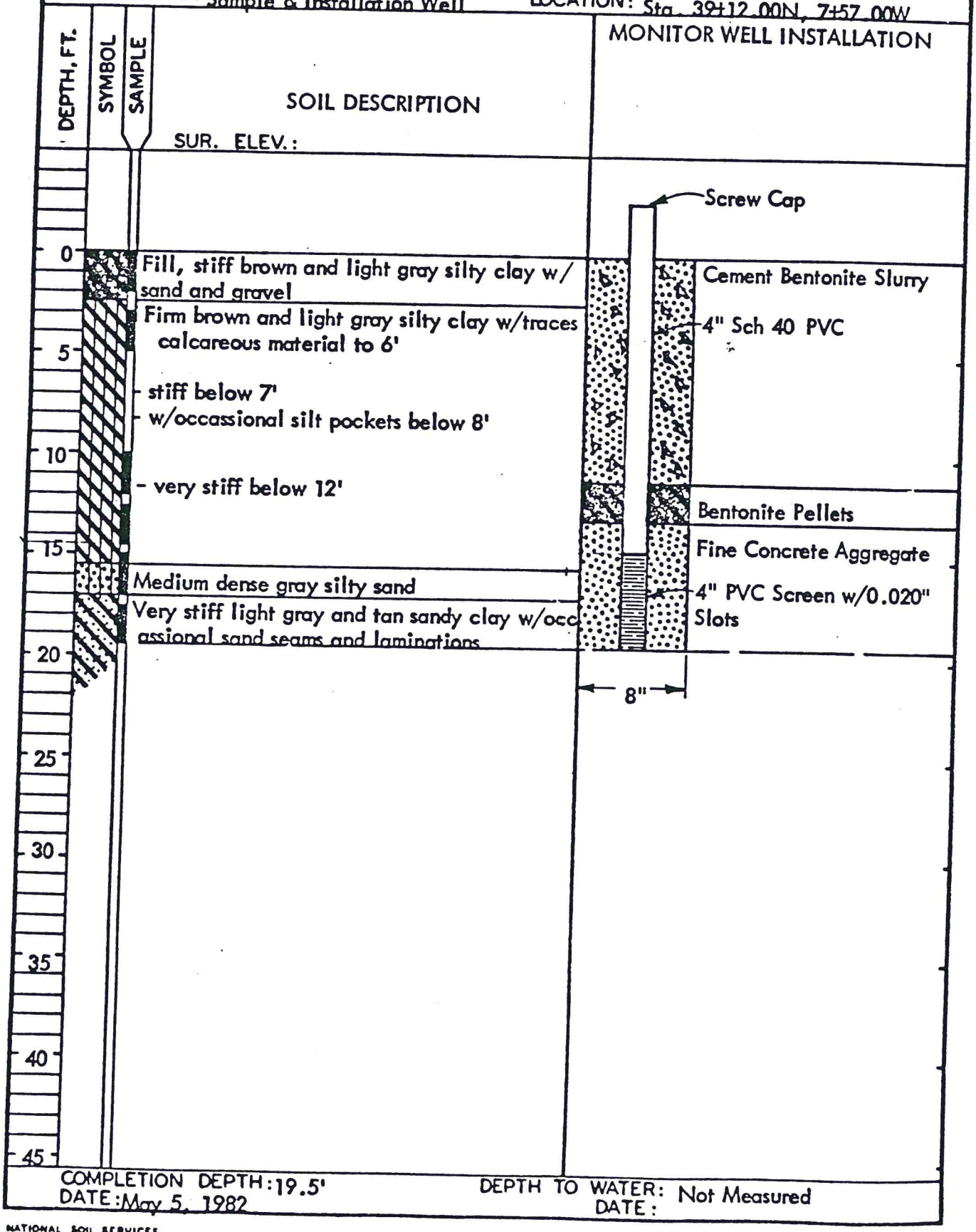
DEPTH TO WATER: 5.9'
DATE: May 6, 1982

NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 3

LOG OF BORING NO. MW-3
MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

TYPE BORING: Sample & Installation Well LOCATION: Sta. 39+12.00N, 7+57.00W



COMPLETION DEPTH: 19.5'
DATE: May 5, 1982

DEPTH TO WATER: Not Measured
DATE:

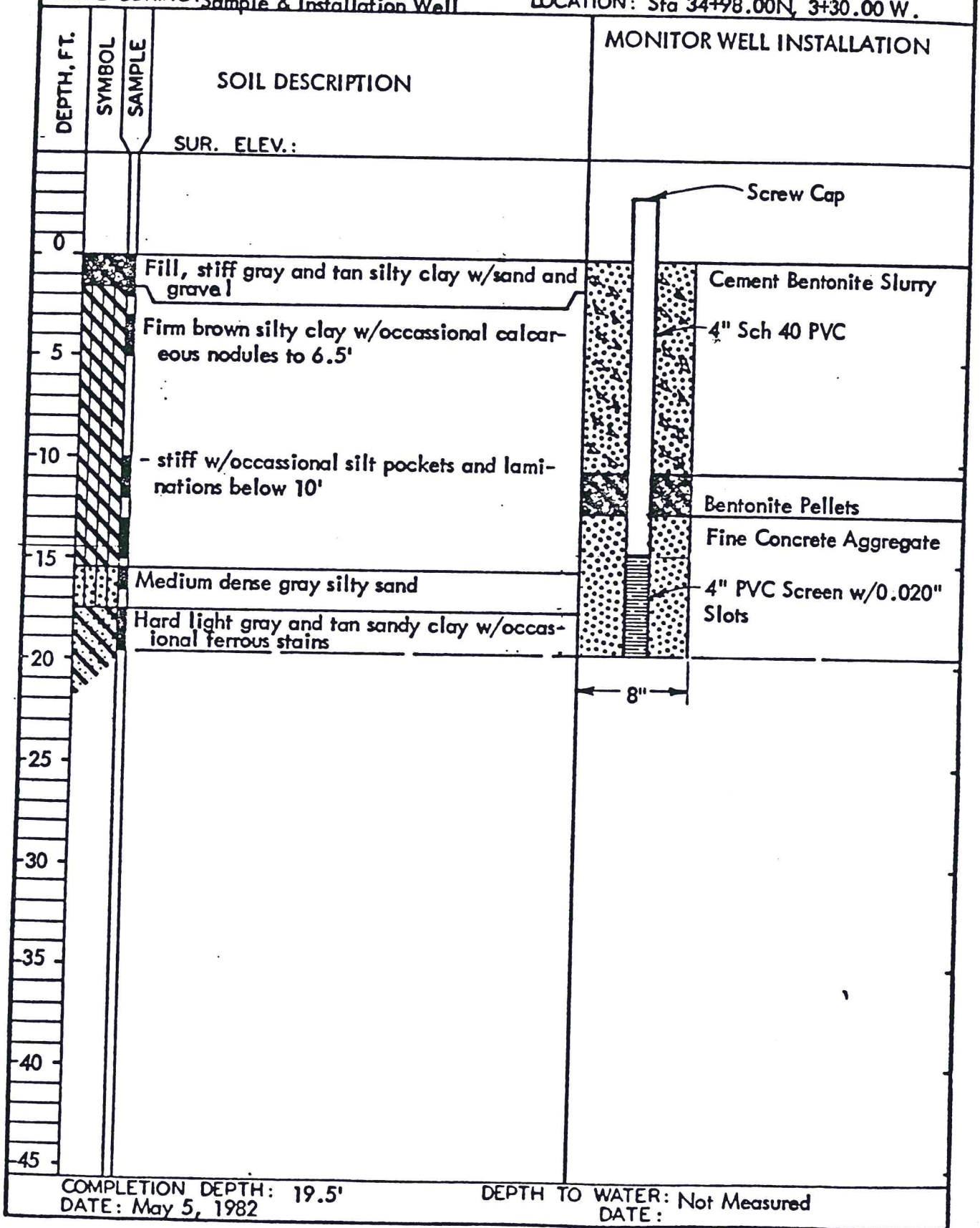
NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 4

LOG OF BORING NO. MW-4

MONITOR WELLS
HAZARDOUS WASTE PROCESSING AREA
UCC - BROWNSVILLE, TEXAS

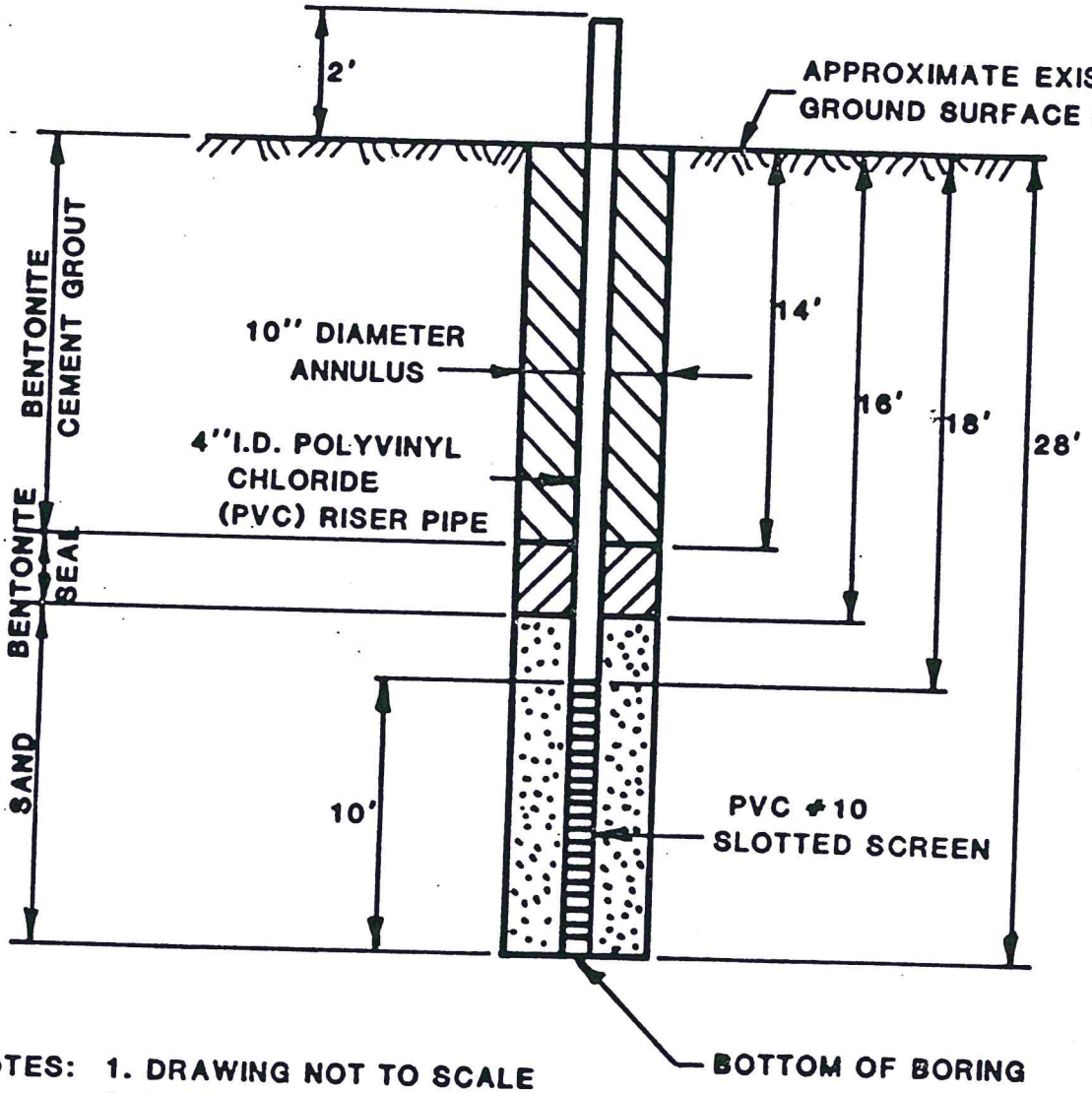
TYPE BORING: Sample & Installation Well
LOCATION: Sta 34+98.00N, 3+30.00 W.



COMPLETION DEPTH: 19.5'
DATE: May 5, 1982

DEPTH TO WATER: Not Measured
DATE:

NATIONAL SOIL SERVICES
CONSULTING ENGINEERS



NOTES:
1. DRAWING NOT TO SCALE
2. DEPTH DATUM IS GROUND SURFACE
3. FOR LOCATION OF WELLS SEE FIGURE 1
4. WATER LEVEL AT 12.23 FEET BELOW TOP OF CASING ON 9/23/85.

UNION CARBIDE CORPORATION

WELL INSTALLATION
WELL MW-5

Project D866-250 Site UCC BROWNSVILLE **BORING** MW-5 Sh 1 of 1

Date Started 9-20-85 Completed 9-20-85 Ground Elevation

Total Depth 30 feet Location BALL MILL BASIN Logged by CAMERON TELLER

Casing I.D. 4 inches Contractor SOUTHWESTERN LABORATORIES

Remarks WELL INSTALLED ON EAST SIDE OF BASIN

BORING DRILLED WITH 6" I.D. HOLLOW STEM AUGERS - NO DRILLING FLUID.

Elev. Feet	Depth Feet	Sample: Type & Number	Sample: Blows per 6 In.	Sample: Depth Range	Sample: Rec.	Graphic Log	Sample Description	Equipment Installed
	0							2' STICKUP
		J1	N.A.	0-2'			FILL - DARK BROWN CLAY W/ROOTLETS AND SHELL FRAGMENTS.	
		J2		2-4'				
	5	J3		4-6'			BROWN SILTY CLAY	
		J4		6-8'			— SOME SAND FROM 8'	
		J5		8-10'			— Fe CONCRETIONS & STAINING FROM 10', GRADUALLY SOFTER	
	10	J6	N.A.	10-12'				
		J7		12-14'				
	15	J8		14-16'			— LESS SILTY FROM 15' — STIFFER FROM 16'	
		J9		16-18'				
	20	J10	N.A.	18-20'			GRAYISH-BROWN SILTY FINE SAND, HIGH WATER CONTENT.	
	25	J11		23-25'				
							GRAY TO YELLOW TO BROWN MOTTLED SANDY CLAY	
							— CALCAREOUS FROM 28'	
	30	T12	N. A.	28-30'			SHELBY TUBE PUSHED FOR SAMPLE →	
							Bottom of Boring at 30.0'	

1911 (1 81)

ERT
ENVIRONMENTAL RESEARCH & TECHNOLOGY INC

Attachment B

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

TEXAS WATER DEVELOPMENT BOARD
Louis A. Beecherl, Jr., Chairman
George W. McCleskey, Vice Chairman
Glen E. Roney
W. O. Bankston
Lonnie A. "Bo" Pilgrim
Louie Welch

Harvey Davis
Executive Director

TEXAS WATER COMMISSION
Lee B. M. Biggart, Chairman
Felix McDonald
John D. Stover

July 1, 1982

Mr. W. W. McManus, Plant Manager
Union Carbide Corporation
P.O. Box 3370
Brownsville, Texas 78520

Dear Mr. McManus:

RE: Solid Waste Registration No. 31108
Hazardous Waste Ground Water Monitoring
Cameron County

The Texas Department of Water Resources (TDWR) has received your letter dated May 25, 1982 which requests a partial waiver of the ground-water monitoring requirements which apply to a hazardous waste surface impoundment at the company's Brownsville facility. The Department has by previous letter dated February 23, 1982 responded to an earlier request by the company that all of the hazardous waste ground-water monitoring requirements for the facility be waived. The Department responded that the facility does not pose a sufficiently low potential for the migration of hazardous waste constituents to warrant a full waiver of the ground-water monitoring requirements. The company was instructed to install a monitoring system for the surface impoundment within 90 days in conformance with Texas Administrative Code (TAC) Sections 335.191-.195 (TDWR Rules 156.22.12.001-.005). The company notified the Department by letter dated May 17, 1982 of the installation of four wells which constitute the physical components of a ground-water monitoring system capable of complying with the cited rules. During a technical conference in Austin on April 16, 1982, TDWR staff members agreed that due to the favorable hydrogeologic environment it would be appropriate for the company to request a partial waiver which would allow less frequent ground-water monitoring for a reduced list of parameters than that specified in the solid waste rules.

In accordance with TAC Sections 335.191-.195 (TDWR Rules 156.22.12.001-.005), the TDWR approves the ground-water monitoring plan described in this letter. This action constitutes a partial waiver of the hazardous waste ground-water monitoring requirements which would otherwise apply to the surface impoundment. The ground-water monitoring system must comply with TAC Section 335.192 (TDWR Rule 156.22.12.002) which establishes construction and performance standards for the monitoring system. An upgradient (unaffected) well (i.e., MW-4) and three downgradient wells (i.e., MW-1, MW-2, and MW-3) shall be sampled on an annual basis. Ground-water samples withdrawn shall be analyzed for: arsenic, barium, cadmium, chromium, lead,

mercury, selenium, silver, total dissolved solids, calcium, sodium, bicarbonate, chloride, fluoride, nitrate, potassium, iron, magnesium, sulfate, and total organic carbon. Elevation of the ground-water surface at each monitoring well must also be determined each time a sample is obtained. The following sections of the Department's solid waste rules apply to the ground-water monitoring system to be implemented by the company: TAC Section 335.191 (TDWR Rule 156.22.12.001); TAC Section 335.193(a) [TDWR Rule 156.22.12.003(a)]; TAC Section 335.194(a) [TDWR Rule 156.22.12.004(a)]; and TAC Section 335.194(f) [TDWR Rule 156.22.12.004(f)]. Records of the analyses and ground-water surface elevations are to be maintained throughout the active life of the facility and for the post-closure care period as well. Results of the analyses and ground-water level measurements are to be submitted annually by January 21 as part of the annual report required by TAC Section 335.175(b) [TDWR Rule 156.22.11.005(b)].

If we may be of further assistance in this matter or if you have any questions regarding this letter, please contact the Solid Waste Section at AC 512/475-2041.

Sincerely,

Harvey Davis

Harvey Davis
Executive Director

cc: Solid Waste and Spill Response Section, Enf. & Field Oper. Division
TDWR District 11 Office - Weslaco

Attachment C

Contamination Indicators

	MW-1 (down)	MW-2 (down)	MW-3 (down)	MW-4 (up)	MW-5 (down)
pH					
1982	6.98	6.60	7.20	6.46	-
1983	7.19	6.68	7.26	6.44	-
1984	7.22	6.84	7.25	6.55	-
1985	7.02	6.55	7.15	6.72	6.85
TOC (ppm)					
1982	280	63	147	50	-
1983	251	54	67	7	-
1984	275	34	66	0.4	-
1985	216	42	89	39	19

Groundwater Elevations

MSL (ft)					
1982	2.44	2.00	2.18	1.98	-
1983	3.22	2.28	2.41	2.41	-
1984	4.1	2.73	2.9	3.15	-
1985	1.92	1.99	2.00	1.23	1.41